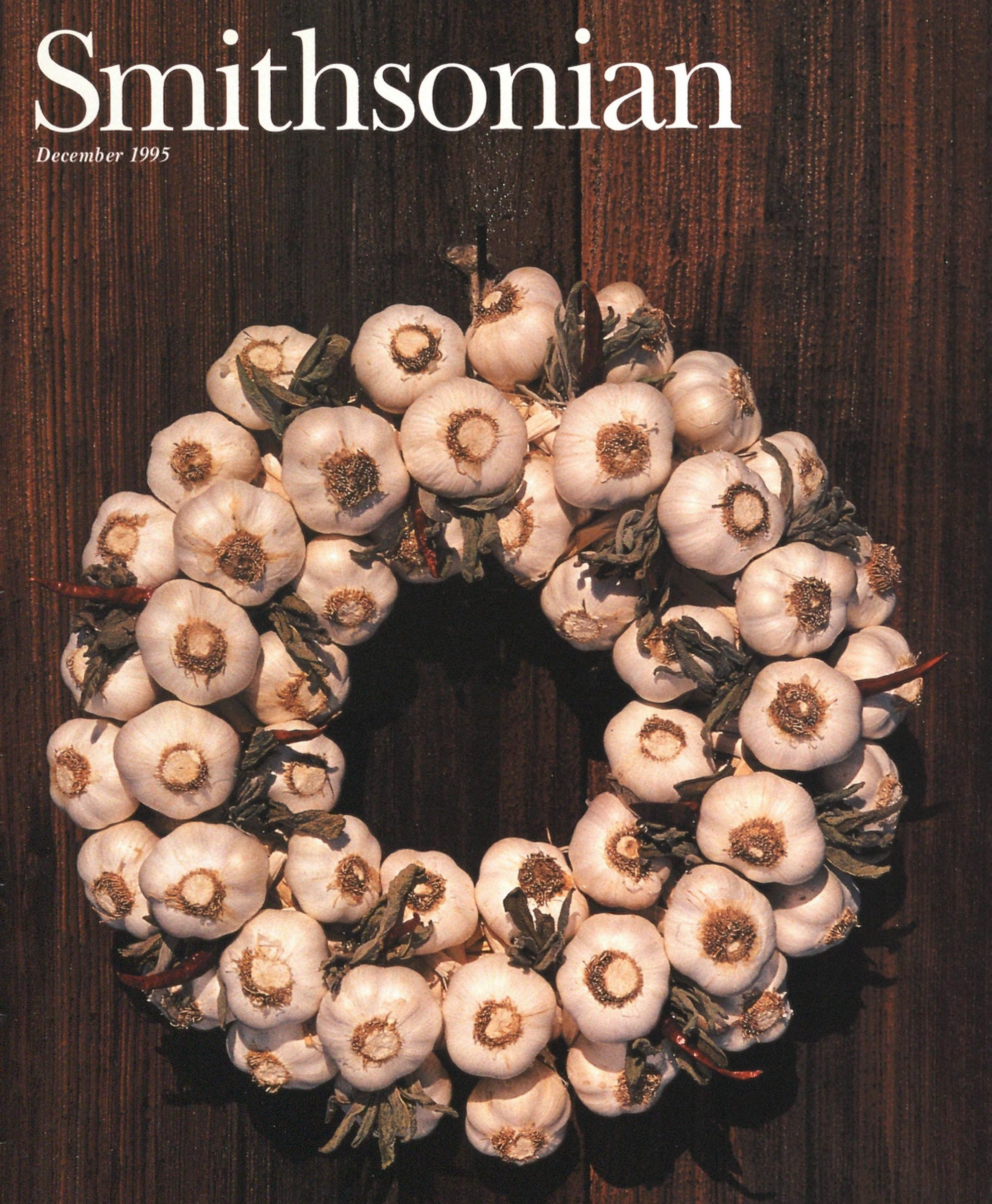
Smithsonian

December 1995



GARLIC

The homely herb at last comes into its own (p. 70)

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Imaginatio

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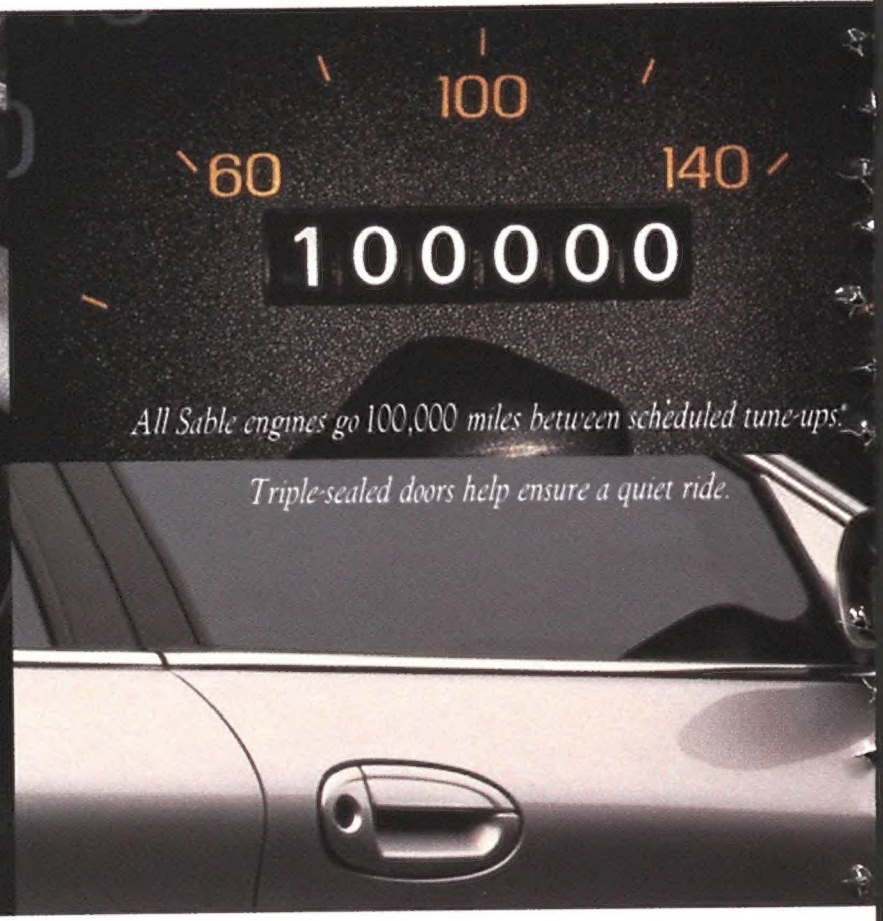

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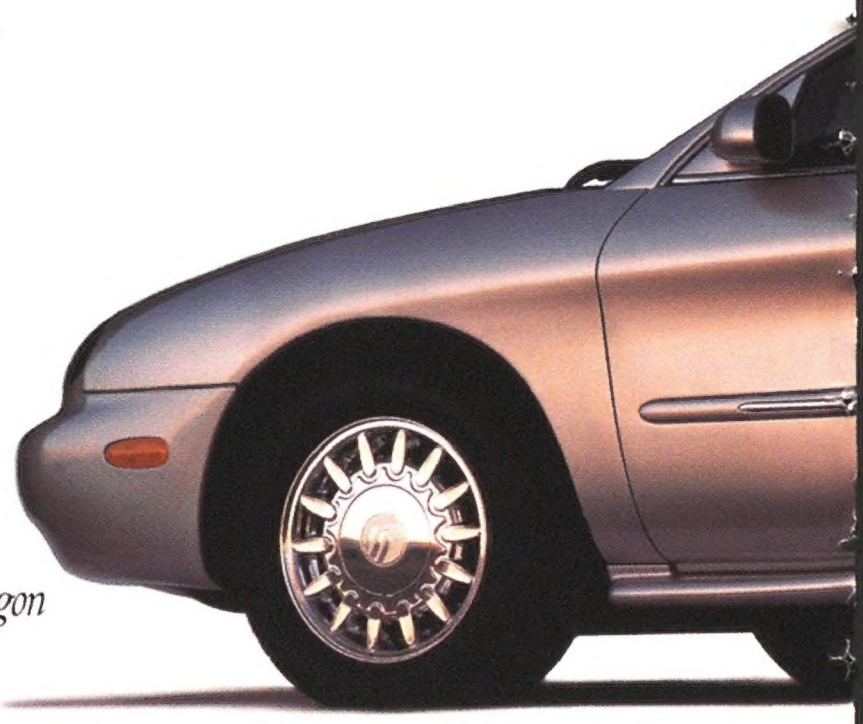

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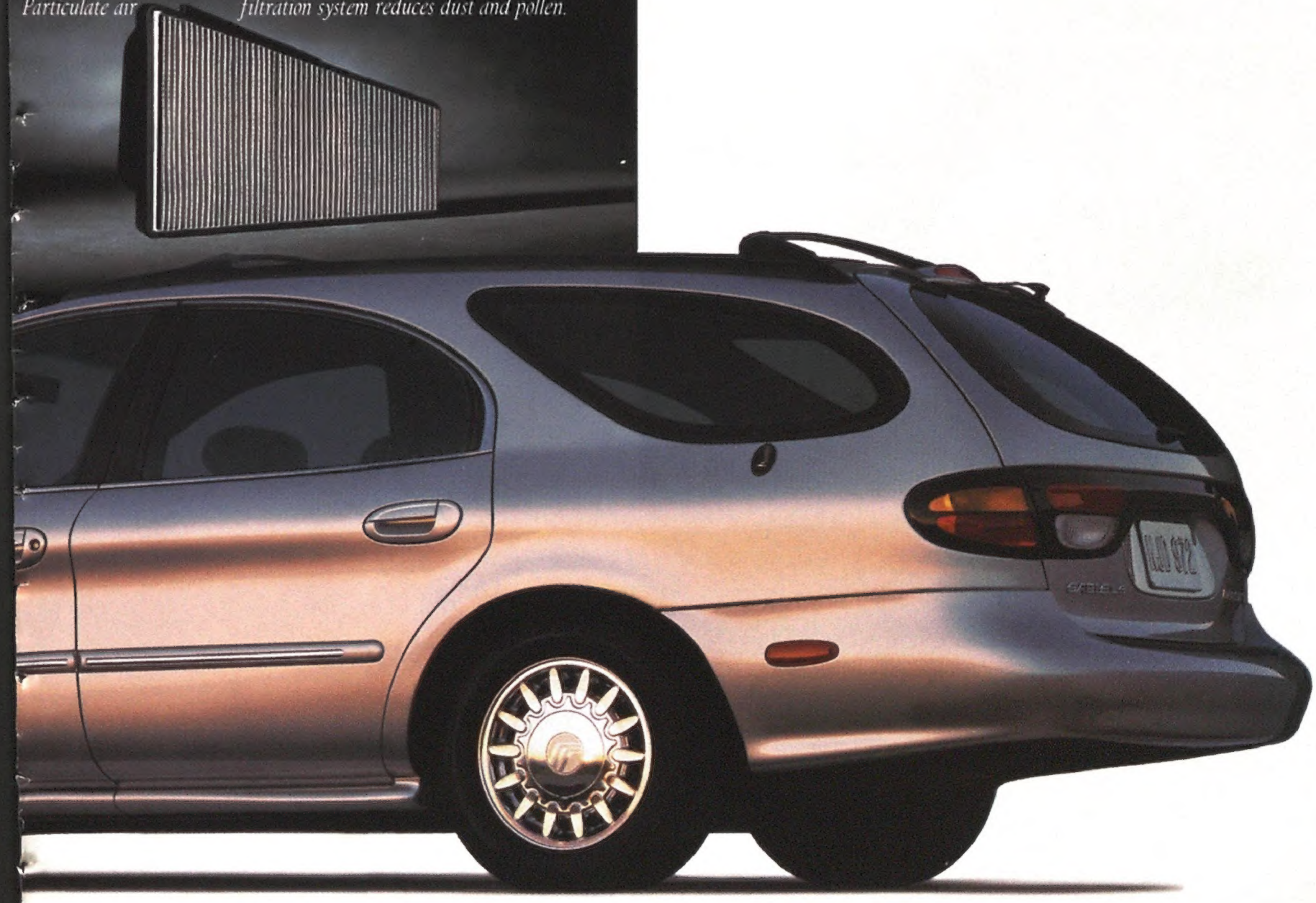

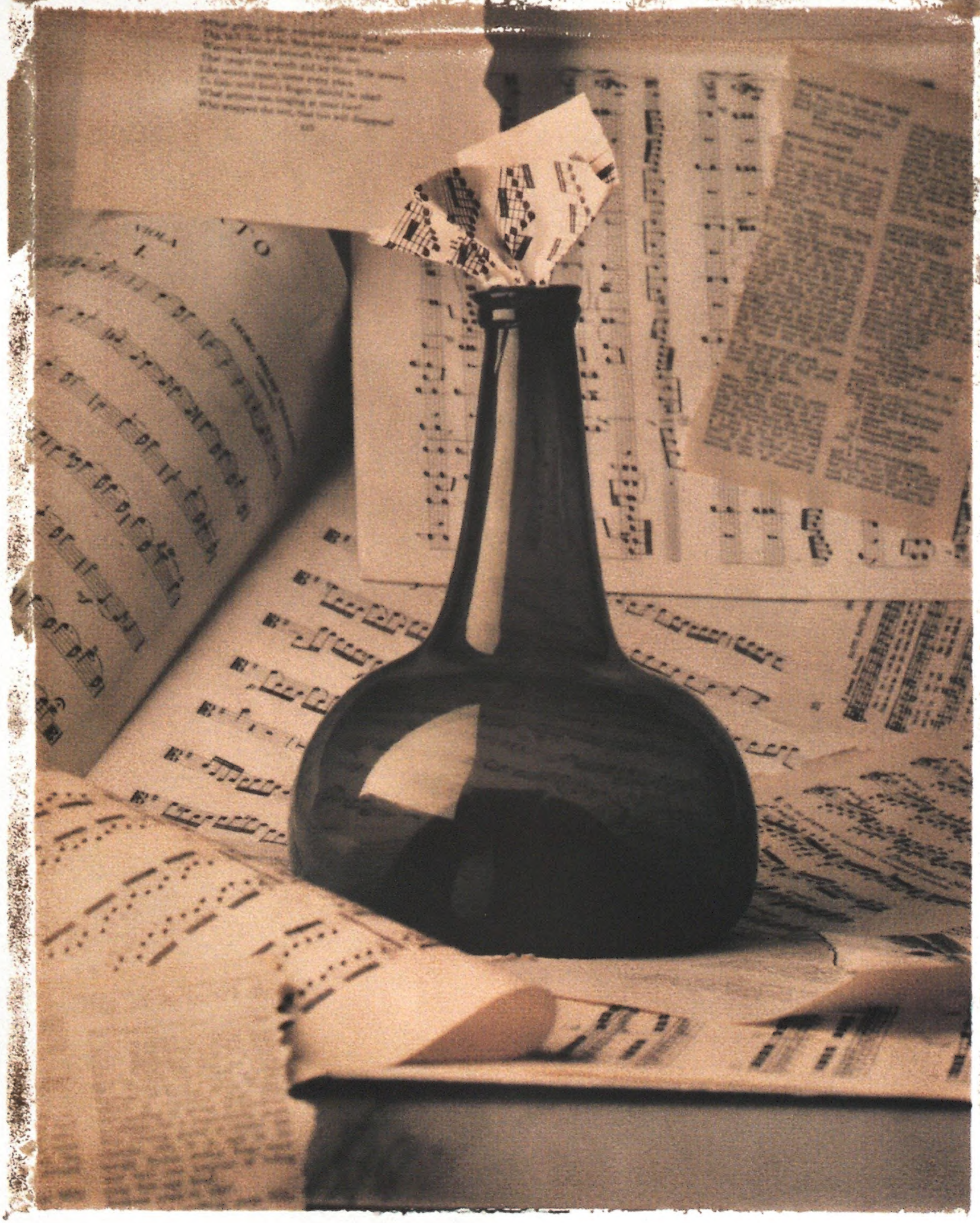

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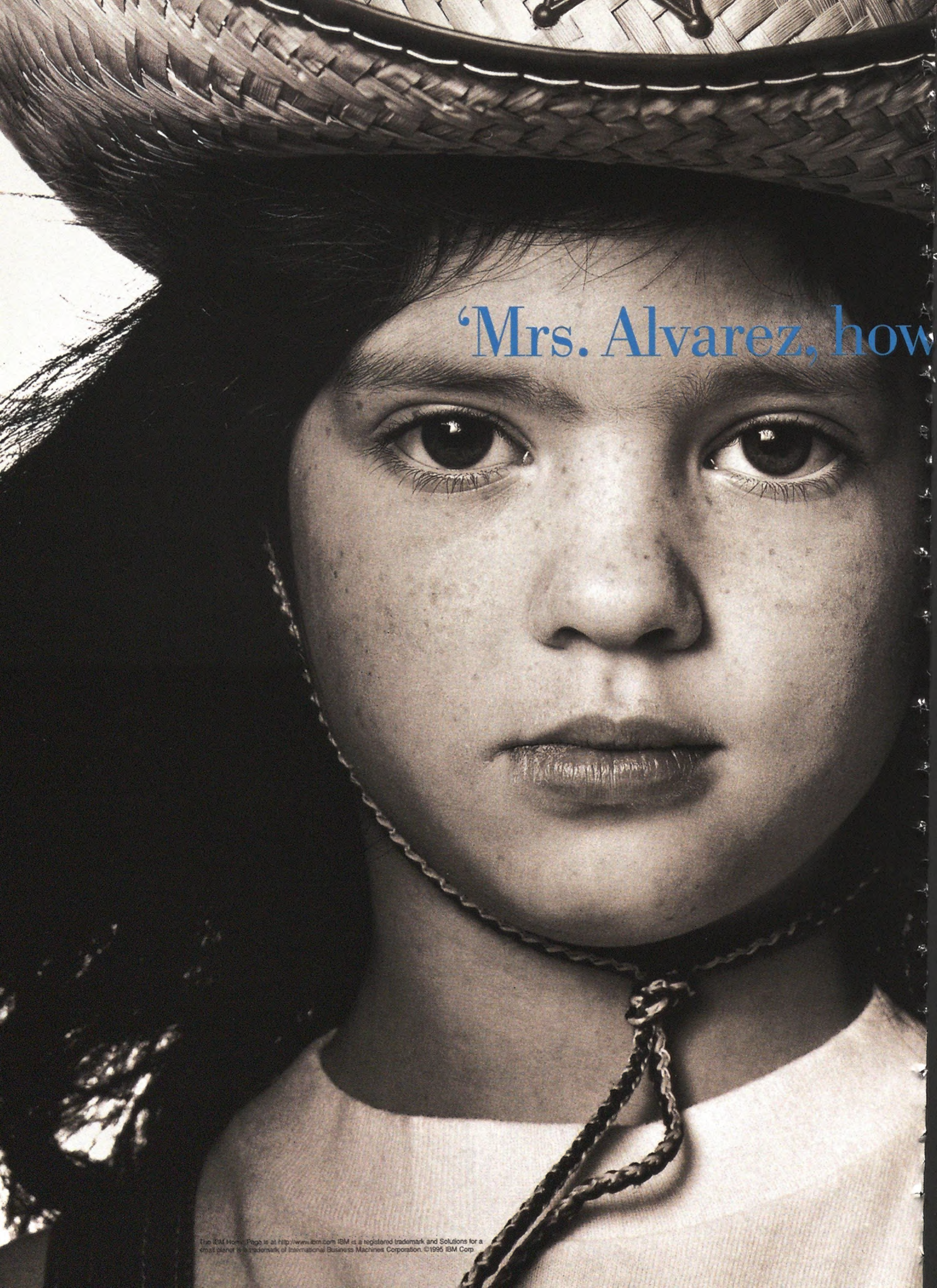

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Smithsonian *features*

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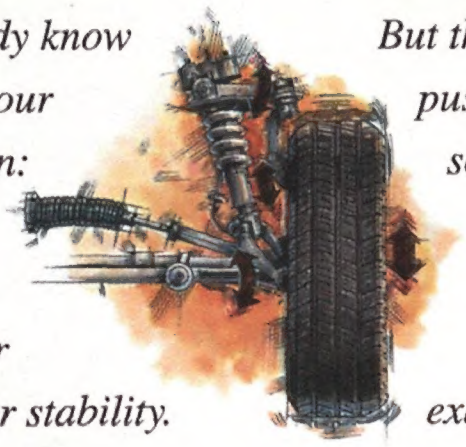

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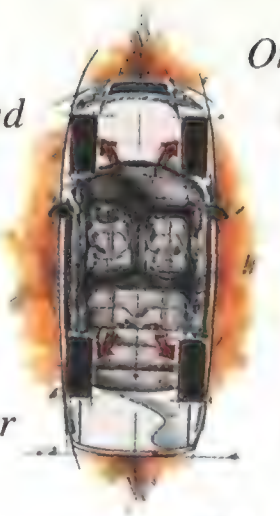

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Smithsonian *departments*

December 1995
Volume 26, Number 9

Cover

Cover:
Take 50 fresh garlic bulbs, add sage leaves and chile peppers—and presto! a three-ring garlic wreath both decorative and edible. This beauty was fashioned at the Christopher Ranch in Gilroy, California (p. 70)
Photograph by Chad Slattery

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Atlantis Predator Pool, Paradise Island

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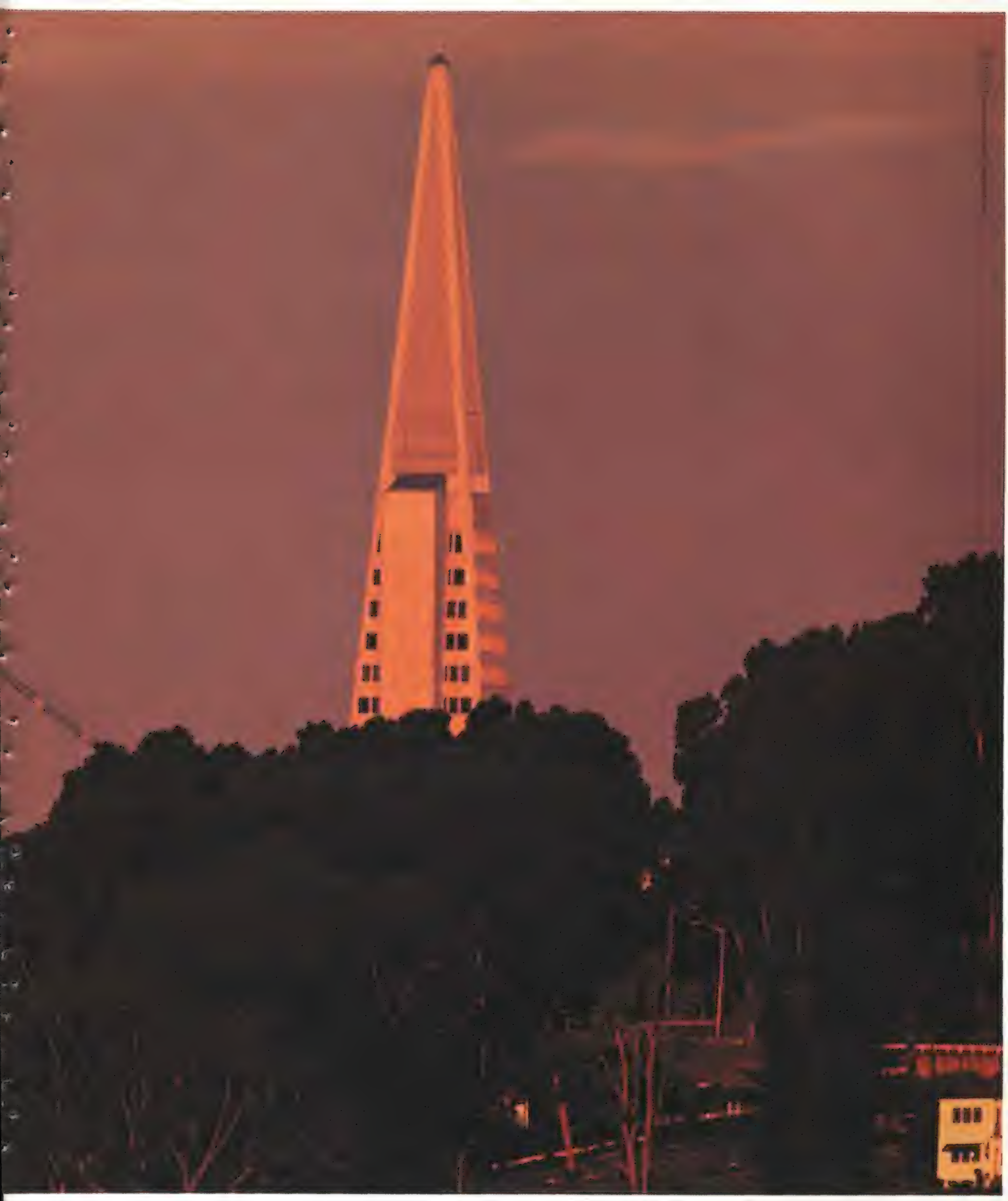

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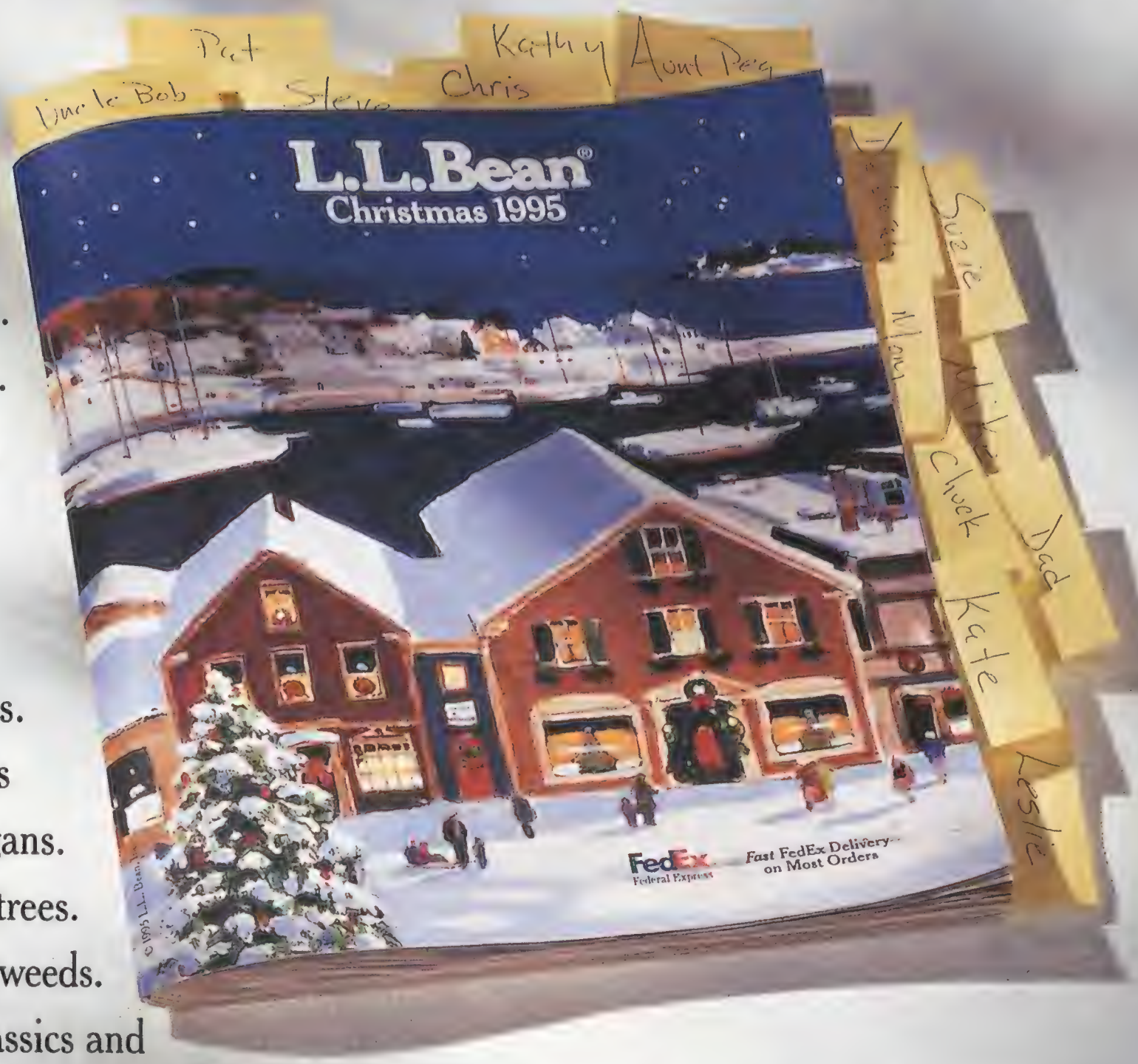

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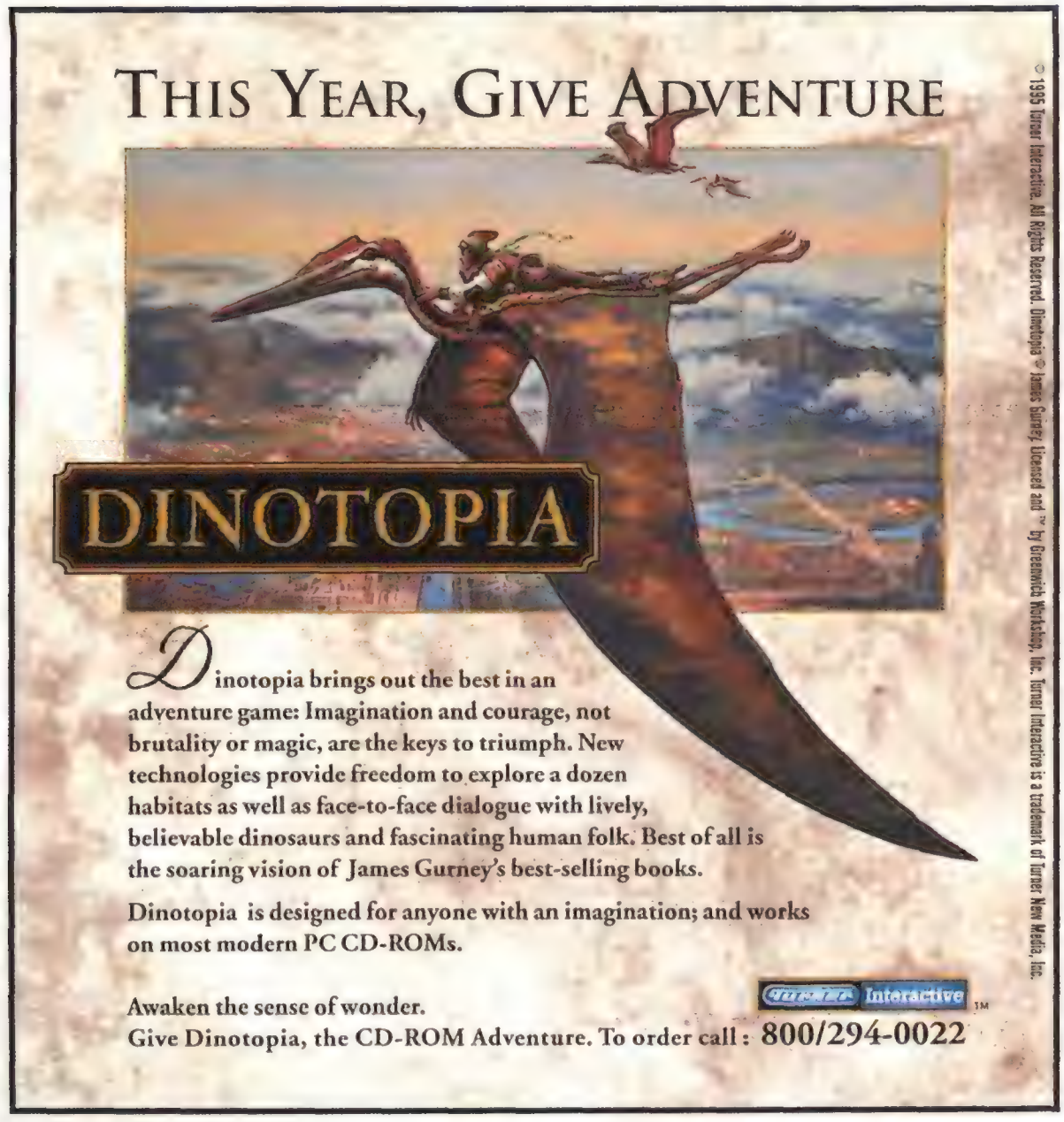
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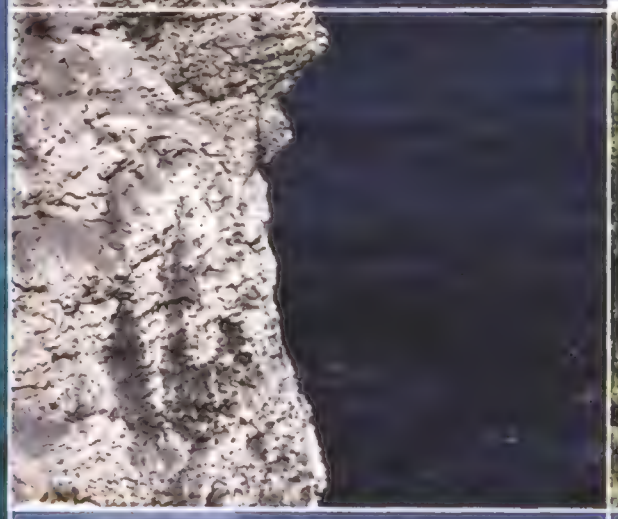

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Secretary Heyman's comments

Smithsonian Perspectives

Some reflections on the first year in office—and a look at the likely changes and challenges facing us

The following is adapted from the Secretary's progress report to the Institution staff in October:

My first year in the role of Secretary seems simultaneously to have begun yesterday and a decade ago. I can hardly remember doing anything else; yet I don't know where the year went.

Three major events have punctuated the year for us. First, somewhat unexpectedly, leadership changed in Congress, and we had to get to know a whole new group of legislators and staff whose actions could deeply affect us. Second, the *Enola Gay* episode exploded, raising other issues as well, and dominated attention internally and externally; we were uncertain whether the Smithsonian would continue to be cherished in the light of so much negative publicity. Third, it became apparent that Congress (in a fairly bipartisan way) was going to take serious action to tame the federal budget deficit, that our own budget was to be affected negatively, and that we would have to concentrate on where to reduce operations in order to live within a lower appropriation.

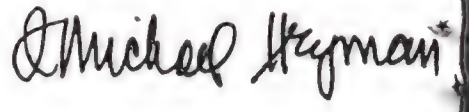
At present, it appears that we have established a good relationship with our oversight and appropriation committees and others in the legislature. This is evidenced by fair treatment in the budget process, real participation by our Congressional Regents, both old and new, at Institution events including Regents' meetings, and a showing of great interest in many of our activities by the Speaker, other legislators and key Congressional staff.

The *Enola Gay* imbroglio was an enormous trial, especially for a new Secretary. Reverberations will continue, notably in learned journals. Whatever the merits of my final decision (which I believe was correct), the conflict has required us to question anew how to respect scholarly integrity and also to assure our general and specific publics that when we deal in controversial areas, we are not using exhibitions to inculcate a particular viewpoint. This is no easy task. The conference we cosponsored with the University of Michigan in Ann Arbor last April explored many sides of the issues. The exhibition guidelines we fashioned together set forth useful processes. But there is no substitute for good judgment and a disposition to try to be objective, no matter how hard the quest. Some are worried that the Smithsonian's reputation in the academic world has been harmed by the change in the exhibit. Let me emphasize that I do not urge the avoidance of all potentially controversial exhibitions. When they are done well, they respect both the subject and the audience, and promote genuine understanding of tough issues.

Our budget problems are real. We received sympathetic treatment in Congress, at a time when both sides of the political aisle were seriously addressing the budget deficit. At this writing, Congress has saved the planned Cultural Resources Center of the National Museum of the American Indian (although its completion will also require the expenditure of some private funds raised by the museum), increased our repair-and-renovation budget by 30 percent (a welcome enhancement to address serious facility problems), and appropriated enough money to finance serious planning and feasibility studies for a National Air and Space Museum extension at Dulles International Airport. At the same time, Congress effectively cut our base budget by failing to fund mandatory wage and inflationary increases (true of most federal agencies). This will result in a base reduction of 4 to 5 percent in our budget.

If one could predict that the base cut was a one-year phenomenon and that losses would be replaced in the future, we could stand pat and do little to reduce our expenditure patterns. But we cannot make that prediction. It is clear that changes in the management structure and style of the Institution are required to prepare it for the challenges of the 21st century. The changes required are not minor. A change in the organization's culture is a paramount necessity. Some of that change will result from restructuring organizational units—the flattening out of management levels. Other changes will result from increased decentralization and delegation of authority to the museums and research institutes. We must continue to reconfigure ourselves and to make permanent reductions. The Strategic Planning Committee that we formed this summer is discussing and evaluating possible future consolidations and privatizations.

I end this report with a good deal of enthusiasm for the 150th-anniversary celebration, which features a wonderful traveling exhibition that will bring the Smithsonian to people around the country. I hope that the activities will both reinforce the splendor and importance of the Institution in the minds of Americans and lead to expanded private support for our undertakings. Our future health depends on a generous private sector to enhance our public resource base.



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Letters to the Editor

Missing children

Dear Sir: I am the mother of Roman Lamar Henderson, one of the children featured in Donald Dale Jackson's October article. My son's father, Randell Lamar Henderson, abducted my 9-year-old son in June 1994, taking also a part of my heart and soul. I cannot even begin to express the nightmare a situation like this is for the "left behind" parent and other family members. I hope and pray every day that my little boy is safe, well and happy. I am very grateful to you for publishing the photographs of Roman and the other children in your magazine. Media coverage is crucial to finding my son and other missing innocents.
Jean Henderson
Miami

Dear Sir: Over the years I have received many of the blue ADVO postcards, which I study carefully, always touched by these serious happenings. It surprises me that so many people read only a few of the mailings or none at all, feeling that since it isn't happening to them they need not be sensitive or concerned.

The research Jackson described is fascinating, and the National Center for Missing and Exploited Children's artist Horace Heafner's work on age-progressed pictures of missing children is outstanding.

Your article should be read and reread as a reminder to be aware, alert and watchful.
Anne P. De Muth
Santee, California

Dear Sir: Donald Dale Jackson noted the wonder of computers in helping to locate missing children. Here in Hudson County we take digitized photographs of elementary school students throughout the county and store the images and other relevant information on CD-ROMs. Law enforcement agencies, the National Center for Missing and Exploited Children and other organizations can instantly access the file, accelerating the search process during the critical first few hours.
Carmen Messano
Hudson County Prosecutor
Jersey City, New Jersey

Steam locomotives

Dear Sir: You may be interested to know the names of the crew on the last U.S.-built switching locomotive on pages 64-65. The brakeman standing in front of the train on the far right is Frank Anderson. Conductor Joe Robertson holds a lantern in the foreground. John L. Giles sits in the window, and Harry V. Crigger, the only man still living of those pictured, is standing in the gangway. Harry retired in 1985.
Mrs. Harry V. Crigger
Roanoke, Virginia

Dear Sir: I am sorry to report that the short essay accompanying Winston Link's steam railroad photographs contains a very personal error: my name is correctly spelled Garver, not Garvey. I'm the author of the text of Winston's most recent book of photographs of the Norfolk and Western Railway at the end of steam power on the line, *The Last Steam Railroad in America.*

Maybe the misspelling shouldn't surprise me because, when it comes to words and names, Winston Link is a past master of spoonerisms and tricks with words. He loves to collect names and has been known to rename dogs after friends from long ago and give pigs the names of his enemies. He'll turn words around as well, warming himself, for example, with a cup of "choc hotlet" in the winter or diving into a "pimming swool" in the summer.

I think he may love to play with names because his first name is Ogle and his initials spell OWL. Calling me Tom was much too ordinary, and in the almost 40 years I've known him, he's always called me Haskell, my middle name and one used by no one else.
Thomas Garver
Madison, Wisconsin

Armadillos

Dear Sir: Many people know armadillos by the moniker "opossum on the half shell." Besides sharing similar size, shape and gait, both creatures are notorious for being found dead alongside Southern roads. In fact, their respective ranges can be determined by the highway sightings where one replaces the other as victim.

I, too, am puzzled by armadillo-opossum behavior just prior to vehicular critter-slaughter. Why they seemingly throw themselves into harm's way I do not know; I just know they do.
Steve Jones
Dahlonega, Georgia

Dear Sir: Bil Gilbert's article mentioned the conversion of armadillos into souvenir items but failed to mention the legendary West Texas custom of stuffing the carcasses with willow twigs. The end product is the famous Amarillo Armadillo Willow Pillow.
Herbert L. Gaede
Oshkosh, Wisconsin

Weekly newspapers

Dear Sir: Richard Conniff's article on the *Rio Grande Sun* was brilliant. You can agree or disagree with Bob Trapp, the paper's editor and publisher, but the general consensus is this is the kind of journalism that we need not only in the small towns of America but also in some of the larger cities.

Former governor Edwin Mechem and I have subscribed to the newspaper since 1957 because of its magnificent political reporting. Too bad the whole country can't subscribe to publications of the *Sun*'s caliber.
David F. Cargo
Former Governor of New Mexico
Albuquerque

Dear Sir: *The Journal-Press* of the Greenwich, New York, area first appeared in 1842 as *The Washington Journal.* In 1917 my sister Sally's father-in-law, Grant Tefft, took it over, and it has remained

Photography by Beatriz Schiller

794 times the Metropolitan Opera has brought *Madama Butterfly* to the stage. Now they're bringing it to your living room.

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A fish home made of steel accelerates the growth of fish food by giving off iron ions, critical for photosynthesis of plants.

Fish Like Steel-Frame Homes

By Tomoyuki Kohara

Japan's biggest WWII battleship, the *Yamato,* was sunk at the end of the war and now lies at the bottom of the East China Sea. According to anglers in the area, the sunken hulk of the *Yamato* has now become home to large schools of kelp groupers, some close to two meters in length. This makes fishing in the area a dream-come-true for fishermen.

The most popular type of old vessel among fish is the steel ship. Fish prefer steel, not because it makes a good sturdy home, but because the constant exposure of the steel to the sea water causes the steel to give up iron ions (Fe^{++}) to the water. This makes the water around a sunken ship rich in seaweeds and phytoplankton which in turn creates an abundant food supply for fish.

The reason for this is that iron ions constitute an indispensable part of the electron transport system that is so important in the photosynthesis of plants. In the absence of iron, a plant is unable to acquire energy by photosynthesis. Steel boat hulls, which are abundant sources of iron ions, thus make good breeding grounds for fish insofar as they also constitute perfect environments for the growth of the plants that serve as the fish's food.

In Japan, the state is taking the lead in the creation of what might be referred to as artificial reefs to increase the overall size of the country's marine resources. Such artificial reefs come in all shapes and sizes ranging from pyramids to building shapes, with some standing more than 10 meters in height. An artificial reef with a height between 1/9 and 1/10 the depth of the sea in which it stands can generate an up-current of water that makes a more favorable environment for fish. Ironically, we are building structures the size of battleships, not for floating, but for submerging to act as living environments for fish.

About the Author:
Tomoyuki Kohara is a science journalist who is interested in the materials of the life sciences, global environment, and ecosystems. He earned a master's degree from Hokkaido University in piscatology.

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in the Tefft family since then. Sally took over in 1981, and at 77 she has filled all roles on the staff at one time or another out of necessity.

Problems with staffing, financing and meeting deadlines are a continual challenge in that rural area, and Sally has an around-the-clock, seven-day workweek: news breaks when and where it will and must be reported. Despite broken presses, a fire, storms and an eviction (the owner wanted use of the building), the *Journal-Press* has never missed a deadline in 150 years.

My sister's paper is a true part of the community, supporting its charities, projects and aspirations and filling the void left by the large-city dailies.
Claribel Seamer
Stratford, Connecticut

Winslow Homer

Dear Sir: When Winslow Homer lived at Prouts Neck, Maine, he was close to the U.S. Life-Saving Service's Biddeford Pool Life-Saving Station. Surfmen (early Coast Guardsmen) from the station often performed public rescue drills using a breeches buoy. *The Life Line,* your closing picture in Ken Chowder's article, shows a breeches buoy in accurate detail: the surfman wears a pair of canvas breeches that are suspended from a life preserver that is attached to ropes and a pulley.
Ralph Shanks
Petaluma, California

Dear Sir: Your article stated that Winslow Homer "returned to the [Civil War] at least once, observing Grant's successful, if bloody, Peninsular Campaign in 1862." Homer was there; Ulysses S. Grant was not. The Peninsular Campaign was conceived and cautiously executed by Maj. Gen. George B. McClellan from April 4 to July 1, 1862. The large-scale campaign ended with McClellan's eventual withdrawal of troops and failure to take Richmond.

When McClellan began the siege of Yorktown, Grant was being caught off guard by the Confederates in the very bloody Battle of Shiloh, which he turned into a Union victory.
Frederick E. Walton
Raleigh, North Carolina

Dear Sir: The only questionable interpretation in Ken Chowder's otherwise insightful article is the caption for *Fox Hunt*: "With the advantage of numbers, the crows could vanquish the prey, its escape slowed by the deep snow of Maine." First, the fox appears too alert and strong to be game for a few crows. Second, crows are opportunistic scavengers that more likely were following a shrewd hunter who would leave remains of a kill.

Crows relish eggs and baby birds, and they pester adult animals, but it is out of crow character to kill large prey.
Cooper Neville
Glen Cove, New York

Silent films

Dear Sir: A 1960s copy of *Mad* magazine advertised an 8mm short of the Lon Chaney unmasking scene in *Phantom of the Opera* for $5. Viewed on a small screen with no music, the clip seemed ridiculous.

In my two-story basement, however, was a manual Wurlitzer pipe organ that had come from the 4,000-seat Movie Palace in Detroit. I asked John Muri, my friend and a talented theater organist, to play the accompaniment for the *Mad* purchase before a group of "organ nuts." He had played it for Chicago theaters when *Phantom* was released in 1925. Muri wove a quiet, eerie background through the scene, increasing the power as Christine approached the Phantom. We sat frozen in our seats. At the unmasking, the sound of the full organ came crashing down, the hair rose on our necks, and we became nearly wild with excitement.

After that, I collected more silent films. My 150-seat basement now resembles a movie palace with ornate columns, statuaries and a stars-in-the-sky ceiling. The Wurlitzer sits on a lift so it's in the pit for films and up at concert level for organ solos.
Fred Hermes
Racine, Wisconsin

Last Page

Dear Sir: Years ago when dime stores sold dyed Easter chicks to mothers foolish enough to buy them, I purchased one for my too-young daughter. Soon after, she showed me a lifeless ball of fuchsia fluff, gripped tightly in her hand. Knowing that electric shock can restart a heart, I hoped any kind of shock might work. I dunked the chick's head in a glass of ice water, whereupon it perked up and shook off the water. It's recovery was short-lived. The next

morning no amount of ice-dunking or chest thumping would revive the bird. It had chickened out for the last time.
Virginia Ferrill Piland
Berea, Kentucky

Dear Sir: I was appalled by October's "Last Page." It was a long trip through a very disturbing story to arrive at a "cute" punch line.
Lisa Clark
Westford, Massachusetts

Dear Sir: I read Robert W. Creamer's essay "They forced martinis down my throat and kept me prisoner all night," and I laughed so much I cried. Some of my shut-in pals will really enjoy it. On the strength of this article, I have subscribed to SMITHSONIAN.
Eleanor Mazaika
New York City

Letters to the Editor

Dear Sir: The name of the funny film cited by J. Z. Fullmer as *The Black Box* is wrong. The right title is *The Wrong Box.*
David A. Gibson
Spencerport, New York
J.Z. Fullmer's letter had it right; the Letters Editor typed it wrong. Ed.

Object at Hand

Dear Sir: At the turn of the century, the now-defunct *Boston Post* distributed gold-headed canes to many New England towns with the town's name engraved on them. Each town's cane was given to the oldest resident and held for life. When a *Post* cane is passed on or a long-lost cane is returned to its town, it still makes news. This is a lasting gimmick of a grand old newspaper.
Weston E. McEvoy
Franklin, New Hampshire

Dear Sir: Sword canes be damned. The good Irish alternative that supports the walker and comforts the traveler in strange neighborhoods is, of course, the shillelagh. This "equalizer," made of County Wicklow oak or Irish blackthorn, is handed down for generations in Irish families.
James G. Hopkins
Scranton, Pennsylvania

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Phenomena, Comment and Notes

By John P. Wiley jr.

Today's physics appears to allow outrageous possibilities: faster-than-light travel across the galaxy, for example, or even our learning to make new universes to specification

Hellish gases swirl around the entrance to a "wormhole" that connects one side of the galaxy with the other, as envisioned by the producers of *Star Trek: Deep Space Nine.*

On bad days I used to joke about the Universe being the work of a graduate student who, frankly, is not doing all that well. A model of farfetchedness, I thought. Now, however, unexpected support has come from Edward R. Harrison, a cosmologist at the University of Massachusetts, Amherst. He writes in the *Quarterly Journal of the Royal Astronomical Society* that yes, our universe may well have been created by intelligent beings in another universe. That assertion does nothing to explain how the whole thing began. It just moves the question back a step: Where did the universe inhabited by those intelligent beings come from? But Harrison's idea would explain some very strange things about our universe, such as how exactly right for life it is.

The history of the Universe has been summed up thusly: "Hydrogen is a light, odorless gas, which, given enough time, turns into people." When our universe began, it consisted mostly of hydrogen. That gas condensed into galaxies of stars, in whose cores heat and pressure fused atoms into heavier elements, including those necessary for life. Some of those stars exploded, spewing the heavier elements out into space. New stars and planets formed, including our own. On one of those planets, life appeared. Harrison contends that none of it could have happened unless all the physical constants (the speed of light, the charge and mass of the electron, and similar numbers) were just right. Reviewing the work of a long line of cosmologists, Harrison sums up what has come to be known as the Anthropic Principle: the Universe is the way it is because we exist. He explains: "In a universe containing luminous stars and chemical elements essential for the existence of organic life, the physical constants are necessarily precisely adjusted (or finely tuned). Slight deviations from the observed values could result in a starless and lifeless universe."

Consider, for example, Newton's discovery that the gravitational force between any two particles is determined by their masses, the distance between them—and the gravitational constant, a number that always stays the same. If the gravitational constant were smaller, that original hydrogen gas would never have been compressed enough to create the temperatures and pressures needed for ignition, and stars would have been dark balls of gas. If it were larger, stars would burn hotter and burn out long before life had had a chance to get started on any planets that might be orbiting them.

Harrison offers nothing less than natural selection of universes. In his words: "Intelligent life in parent universes creates offspring universes, and in the offspring universes fit for inhabitation, new life evolves to a high level of intelligence and creates further universes. Universes unfit for inhabitation lack intelligent life and cannot reproduce."

Just as in biological evolution, small changes in the fundamental constants can occur in the course of reproduction. They may be random, as in Darwinian evolution, or programmed, as in genetic engineering. The next generation, therefore, will be more or less fit to become the home of intelligent life.

Harrison notes that human intelligence has come a long way in the past million years and wonders how much further we will get in the next million.

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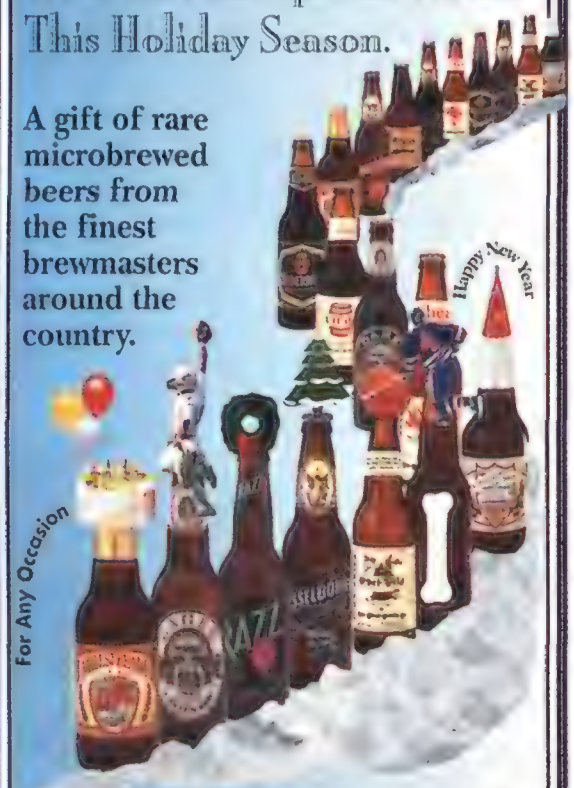

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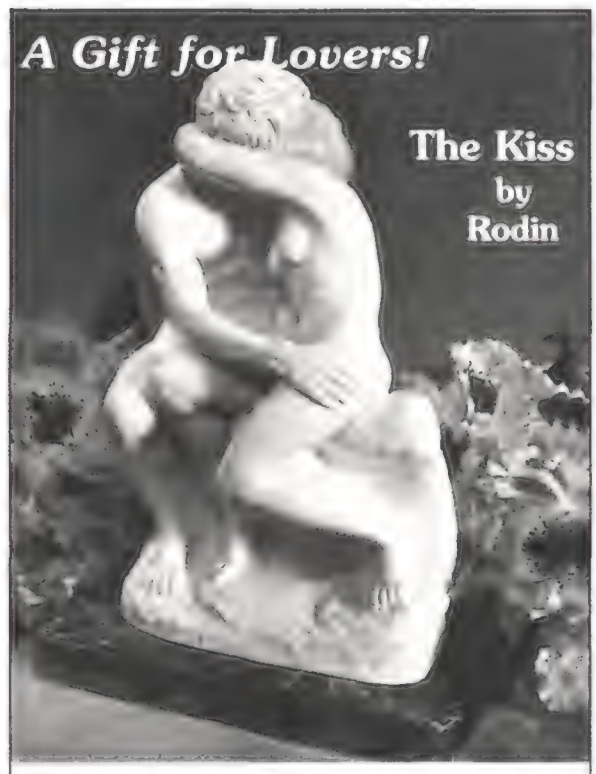

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By then, perhaps, we will be smart enough to create universes for ourselves. It may not take that long. Early in the history of our own universe, some postulate, there was a period of extraordinary expansion called inflation. MIT's Edward Farhi and Alan Guth and the University of Mexico's Jemal Guven may have worked out a way to use inflation to make a universe right in the laboratory. Here is their recipe:

Form a small black hole from matter with a mass of, say, 10 kilograms (22 pounds) in such a way that the interior "immediately inflates," Harrison summarizes, "not in our universe, but in a reentrant bubble-like spacetime that is connected to our universe via the umbilical cord of the black hole." (Don't ask.) The black hole will then evaporate, severing the connection between our universe and the new one. Don't worry if you make a mess of it, Harrison advises: poorly made ones will probably never have life in them.

Even if you could make a universe, why would you? Harrison offers three reasons, in ascending order of importance to ourselves. First, only doing it will prove that you really do know how. Second, you may be able to build one that is even more hospitable to intelligence than this one. Third, you may be able to move into the new universes you create. This last could be important for our survival, as we shall see.

Other universes may already be out there. The brave souls who study quantum mechanics talk blithely of alternate universes. They suggest that every time any person or thing does something, a new universe springs into being. There is the familiar one in which the event happened, and a new one in which it did not. Theoretical physicists speak of an infinite number of parallel universes stacked like sheets of paper in a ream, separate worlds in which the very laws of physics themselves could be different. (Another analogy is a huge conglomeration of soap bubbles floating in the air, with each bubble a separate universe. By some strange coincidence, this is the way galaxies appear to be spaced in our universe.) For a long time, the theorists have wondered if it might be possible to use "wormholes" to travel quickly from one part of our universe to another part, or from our universe to another universe (SMITHSONIAN, November 1977). The idea has become familiar from science fiction, especially

in the television series *Star Trek: Deep Space Nine,* in which the plot centers around a space station positioned at one entrance to a wormhole.

Kip S. Thorne, the Feynman Professor of Theoretical Physics at CalTech, has been thinking about wormholes for a long time. The subtitle of his latest book, *Black Holes & Time Warps: Einstein's Outrageous Legacy,* captures the reaction of most physicists—and ordinary readers—to such ideas. In one chapter, he asks whether a sufficiently advanced civilization will be able to construct wormholes from one part of our universe to another to facilitate rapid interstellar travel. He answers that it possibly could be done by taking advantage of gravitational vacuum fluctuations. These are defined as "random, probabilistic fluctuations in the curvature of space caused by a tug-of-war in which adjacent regions of space are continually stealing energy from each other and then giving it back."

In 1955 John Archibald Wheeler, then at Princeton (*Phenomena,* August 1981), had worked out that in a space that is 20 factors of 10 smaller than an atomic nucleus, the vacuum fluctuations are so overpowering that, in Thorne's words, "space as we know it 'boils' and becomes a froth of quantum foam." Because quantum foam is everywhere, Thorne continues, we can imagine a highly advanced civilization reaching into it, pulling out a wormhole the size of a Wheeler space and enlarging it so it could be used by macrocreatures the size of ourselves.

Michio Kaku, professor of theoretical physics at City College of the City University of New York, goes even further in his recent book *Hyperspace.* Kaku tries to make us at least a little comfortable with the idea of space having more than three dimensions. He recalls that as a child, he watched carp swimming in a shallow pool and realized they had no conception of the world above the surface of the pond. Later he goes on to the classic *Flatland: A Romance of Many Dimensions by a Square,* a book written in 1884 by a clergyman named Edwin Abbot. In the book, two-dimensional beings live on a flat surface. They have no concept of height. Just so, Kaku writes, we have trouble with the idea of more than three spatial dimensions. But that does not mean they do not exist.

"Hyperspace," according to Kaku, merely means space with more than three spatial dimensions. Once this is allowed, he says, a lot of problems in physics clear up immediately. The incompatibilities between relativistic and quantum physics disappear, he continues. If hyperspace turns out to be real, then travel through hyperspace may turn out to be realizable, too.

OK, let's talk about practical benefits. We'll consider only one, the biggest potential payoff of all. Both science fiction writers and serious scientists have thought for a long time that the day will come, if we survive long enough, when we will have to leave Earth and even the Solar System. Now we have something new to think about: leaving this universe when it becomes uninhabitable. If the Universe expands forever, it will eventually end cold and dead, the Cosmic Whimper. If it stops expanding and collapses back in on itself in the Big Crunch, it will end in explosive fury. To the best of my knowledge, neither is expected to happen for tens of billions of years, but Hey! it's good to be prepared. By the time it happens, Harrison, Thorne and Kaku appear to be telling us, we should have learned how to step lightly from this universe into another one. Or make a new one.

In Tom Wolfe's novel *The Bonfire of the Vanities,* a Wall Street bond trader who seemed to have the world by the tail thought of himself as the "master of the Universe." Just one universe? Small potatoes, I say. It looks more and more as though there are lots of universes, perhaps uncountable universes. And my joke and Professor Harrison's conjecture may turn out to be true: you won't be able to get your PhD until you've created a universe.

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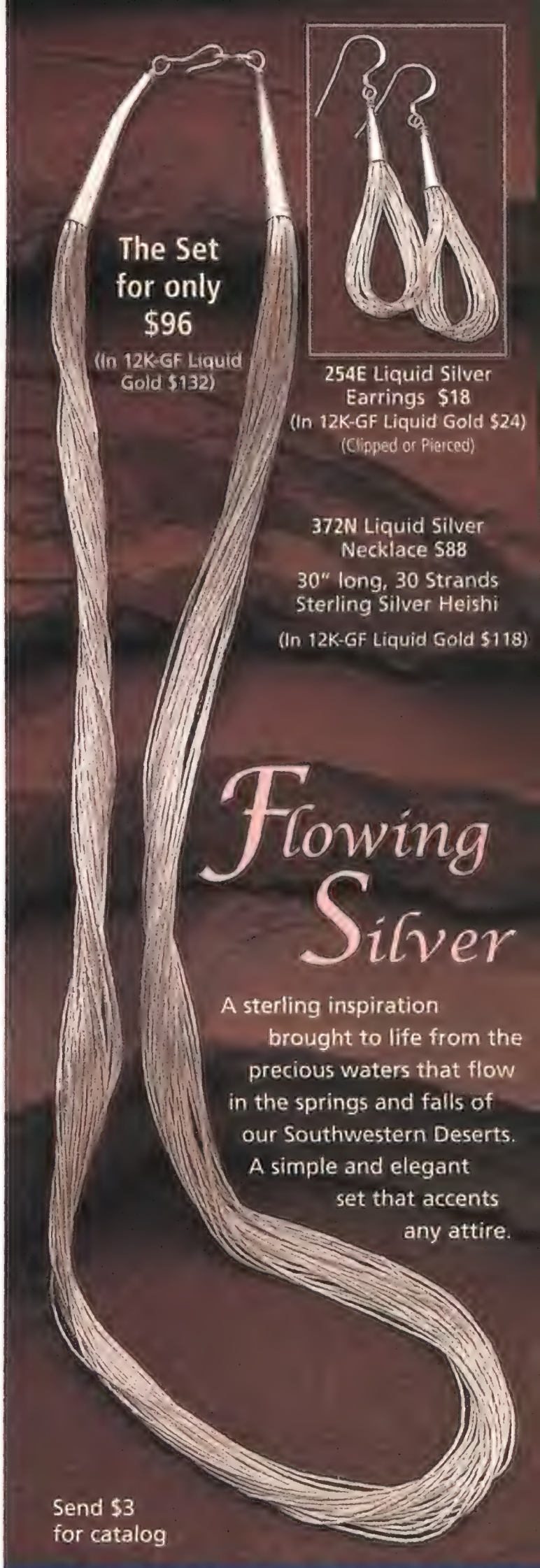
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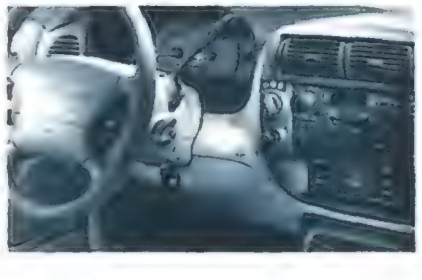

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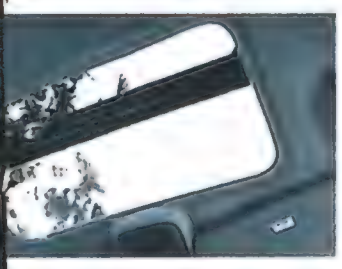

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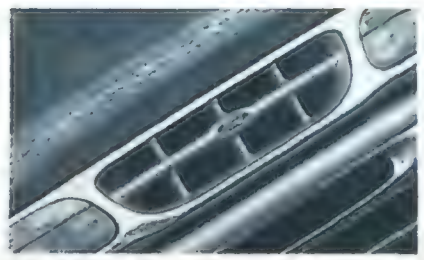

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Around the Mall and Beyond

By Michael Kernan

Alan Fern, director of the National Portrait Gallery, offers his insights on the art of reading a portrait

The other day I got a lesson in how to look at a portrait—not a simple matter—from a certified authority, Alan M. Fern, director of the National Portrait Gallery. "Reading a portrait is in a way just as demanding as reading a text," he said. "It can also be an immediate and human experience."

Take the costume. I had heard of the itinerant artists in Colonial America who, for a price, would paint your portrait, giving you at a stroke a gorgeous gown or suit you never owned. (Novelty photographers on the boardwalk still do it with comic settings.)

This practice was developed to a high degree of sophistication: the subject was shown a number of costumes and scenes into which he or she could be painted. In his museum office, Fern was explaining a lot of recent scholarship to me, so he pulled out a book to show me a portrait of a Mrs. Bowers by John Singleton Copley. Here was an American woman of substance, resplendent in a billowing satin gown with a pug dog on her lap. Then Fern showed me another portrait, this time of a Briton, Lady Caroline Russell. Guess what? Same gown, same pose, same dog, different artist. When he painted Mrs. Bowers, Copley had "borrowed" his entire composition from Joshua Reynolds.

"If you're doing historical research in clothing fashions," Fern said, "you want to be careful about making judgments about what people actually wore."

The issue of authenticity of fashion is one thing; body language is another.

"Go around the gallery and there are all kinds of things you begin to see. There is the whole business of a pose and what it shows about a person."

Think of Napoleon with his hand inside his vest. For generations after that, men all over the world, and especially Civil War generals, had their portraits painted with the hand in the vest.

Think of Boldini's famous portrait of the ineffable Comte Robert de Montesquiou, a model for Proust's Baron de Charlus, one of literature's most wonderfully outrageous characters. Here is Montesquiou, with his waxed mustache and wasp-waisted morning coat, examining the head of his cane, which he holds like a violin in his elegant long fingers. It is the very image of vanity and arrogance. Contrast that with, say, a portrait of Ulysses S. Grant: whomever he sat for, he was the same—stolid, unshakable, direct. (Once when Grant was sitting for Mathew Brady, a shower of thick glass fragments fell from the studio ceiling and landed inches from his chair with a shattering crash. Reportedly, Grant never blinked.)

Fern showed me some other variations: Dashiell Hammett holding himself in, his arms wrapped inside the contour of his figure, giving him a sense of containment, a sense that one could never penetrate to his core. On the other hand, there was Douglas MacArthur, portrayed as a windblown extrovert "coming over the top—as he would have painted himself," said Fern.

A biographer has all the time and space in the world to get across every nuance of the subject's personality and history. The portraitist, whether in painting, sculpture, photography or drawing, gets only one shot. And people change—in age at the very least, and surely in many other ways as well.

For this reason, the National Portrait Gallery shows often present many images of the same person. "We had an exhibit of multiple images a while back," Fern said, "and we had Igor Stravinsky done by several photographers, different ages, different views. Richard Avedon got up close and showed us an old man, a sagging face, tired eyes. Arnold Newman took him from a distance, sitting at a piano: Stravinsky the musician. Irving Penn had him in a corner with his hand cupped at his ear." They are all Stravinsky, just as the Lincoln life mask, the gaunt young Lincoln, the vicious political cartoon versions of Lincoln, are all part of Abe. We are, all of us, many people.

"Then you get into iconography," the director added, "the things you put in the picture to suggest what the subject does, who he or she is." There is a portrait of Thomas Edison done when he was in France to attend the Paris Exposition of 1889 (below). He is demonstrating his battery-powered phonograph, and there it is with its wax

Thomas Alva Edison, painted in 1889 by Abraham Archibald Anderson, depicts the inventor in his laboratory with his recently perfected battery-operated phonograph.

cylinders and all sorts of other stuff, including some electric wires.

"Look at the Lansdowne portrait of George Washington," Fern suggested, "in a plain black civilian suit, with his sword sheathed, standing by books containing the laws of the land. This is a regular American citizen. He's not wearing ermine or anything. But on the other hand, the setting is done in the European manner, the sky, the pillar, the draperies, to give a sense of grandeur. It's a compromise." Just in its visual language, the picture captures one of Washington's great dilemmas when he was first elected President. This was a new role in history, and he had to invent the part. He had to look like a leader but not like a king. Should people bow to him? Should he be called: "Your Excellency"? "Your Honor"? "Sir"?

As for Greenough's celebrated posthumous half-nude sculpture of him (it's in the National Museum of American History), the sculptor took a different tack. Evidently, there Washington was being seen as the embodiment of the Roman republic, a citizen-soldier, a Cincinnatus.

There are other traditions of iconography in portraits. If a child is shown holding calla lilies, he or she is dead and to be mourned. Signs abound in a Dutch *vanitas* painting (a picture about mortality), with its skulls and guttering candles. The elaborate moral tales of Vermeer are contained in necklaces and scales and the like.

Next month the National Portrait Gallery will open a show on the artistic rebels of the 1950s, mainly the Beat poets of San Francisco and the Abstract Expressionist painters of the East Coast. Picking the portraits that would best get the point across was not easy.

"There was a lot of ferment right after the war," Fern noted, "and you had these bookstores along Columbus Avenue in San Francisco and elsewhere, coffeehouses, poetry readings, published broadsheets. You had Lawrence Ferlinghetti and Allen Ginsberg and Jack Kerouac and their death imagery, poems about the shortness of life and how threatening it all is. We picked out the most prominent figures, the ones still being read, but there are others."

In New York the same sort of thing was happening in the visual arts, in the work of the painters Jackson Pollock, Lee Krasner, Willem de Kooning, Philip Guston, and the critics Clement Greenberg and Harold Rosenberg. How to say in a picture what these people stood for?

Well, Pollock was easy. Photographs from *Life* magazine show him in the act of sloshing paint onto a canvas straight from the can. There are also pictures of his freckled, red-haired wife, Lee Krasner, always alongside him, seen as his satellite, for her genius was obscured by his fame for all too many years.

Another painting, of Rosenberg by Elaine de Kooning, has been featured recently in the gallery's foyer as a new acquisition. It is a perfect expression of the man who coined the phrase "action painting" depicted in an action painting by a member of the group he celebrated. "You don't have to say any more about it," Fern remarked.

Another show in the works concerns Edith Wharton and her circle. "What is interesting about her is that she represents a woman of accomplishment in a period when that wasn't so common. She was a broad-gauged person, traveled, well-read; she wrote a book on gardens, was an expert on interior decoration. Her tastes were ahead of her time: she liked simple lines, wicker furniture, openness, light, printed fabrics instead of the usual velvet drapery of the day. The problem is that there are only two or three paintings of her, two of them very young, at 8 and 16, and the rest of her portraits are mainly photographs."

But once the curators add the portraits of the people in her circle, Henry James and the stars of New York society, plus the pictures of her environment, the house in Rhode Island, the mansion in Massachusetts and so on, the many facets of Edith Wharton are evoked, going far beyond a mere facial likeness.

Fern would love to go further in the matter of artifacts. The portrait of composer Virgil Thomson by Alice Neel might be accompanied by, for example, the score of *Four Saints in Three Acts.*

There is still another variable in portraiture: the artist's own feelings. "You paint the President because it's a job; you paint Einstein because you admire him; you paint a friend for love. They're bound to be different in approach."

Fern is, of course, fond of the Thomas Carlyle quote: "Often I have found a Portrait superior in real instruction to half-a-dozen written 'Biographies,' as Biographies are written; or rather, let me say, I have found that the Portrait was as a small lighted candle by which the Biographies could for the first time be read, and some human interpretation be made of them."

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Smithsonian Highlights

Planning a Smithsonian Visit?

Receive a special free Associates' Planning Packet. Write Smithsonian Information, Smithsonian Institution, Washington, D.C. 20560, or call (202) 357-2700, daily, 9 A.M.- 4 P.M.; for callers with communication impairments, TTY: (202) 357-1729. *Note:* Parking near Smithsonian museums is limited. The convenient Metrorail subway has parking available at some stations (details in packet).

Begin your visit at the Smithsonian Information Center's Associates' Reception Desk—open 9 A.M.- 4 P.M. daily—in the Castle. The National Museum of Natural History's Court dining room offers buffet service daily, 11 A.M.- 3 P.M.

Smithsonian Web Site

The Smithsonian home page on the World Wide Web (http://www.si.edu) offers on-line information about exhibitions, collections, products and events.

Museum Hours

Smithsonian museums are generally open 10 A.M.- 5:30 P.M. daily, except December 25. Hours at the National Zoo are 9 A.M.- 4:30 P.M. daily for buildings, and 8 A.M.- 6 P.M. for grounds.

Holiday Events

Traditions of Christmas, Hanukkah, Kwanzaa and the New Year will be observed at the National Museum of American History's annual Holiday Celebration, December 26-31, noon - 4 P.M. daily. Festivities will include music, storytelling and special exhibitions.

Special December Exhibits, Events

S. Dillon Ripley Center, International Gallery

Voyages and Visions: Nineteenth-Century European Images of the Middle East from the Victoria and Albert Museum (through January 1, 1996) Watercolors and drawings track 19th-century Europe's experience of the Middle East. See *Highlights Continued*, page 38.

National Air and Space Museum

Flights of Fancy: Photographs by Jacques-Henri Lartigue, 1904-1922 (through March 3, 1996) Images capture the early years of aviation.

The Enola Gay (runs indefinitely) Exhibition features the forward fuselage of the *Enola Gay*, the B-29 that dropped the atomic bomb on Hiroshima. For information, call (202) 786-2122.

Beyond the Limits: Flight Enters the Computer Age Major gallery explores the computer revolution in aerospace.

Universe of Illusions (through February 4, 1996) Einstein Planetarium show takes a look at some of the mysteries in the history of space exploration.

Africa: The Serengeti (6:15 P.M. daily) New film takes viewer on an Imax safari into the "last great place on Earth."

National Museum of Natural History

Landscape Kimonos by Itchiku Kubota (through April 14, 1996) Japanese artist Itchiku Kubota revived an ancient dyeing method to create an elegant series of handcrafted kimonos. See page 64.

Ocean Planet (through January 1, 1996) Major exhibition looks at the causes and consequences of environmental threats to the world's oceans.

Exploring Marine Ecosystems Newly renovated permanent installation in the Sea Life Hall examines two of Earth's ecosystems—a tropical coral reef and a temperate rocky shore.

Gem and Mineral Hall Gallery is closed for renovation until December 1996. The famous Hope Diamond is on view on the second floor of the Rotunda.

National Zoological Park

Think Tank New permanent exhibit explores the biology and evolution of animal thinking, focusing on orangutans, monkeys, crabs and leaf-cutter ants.

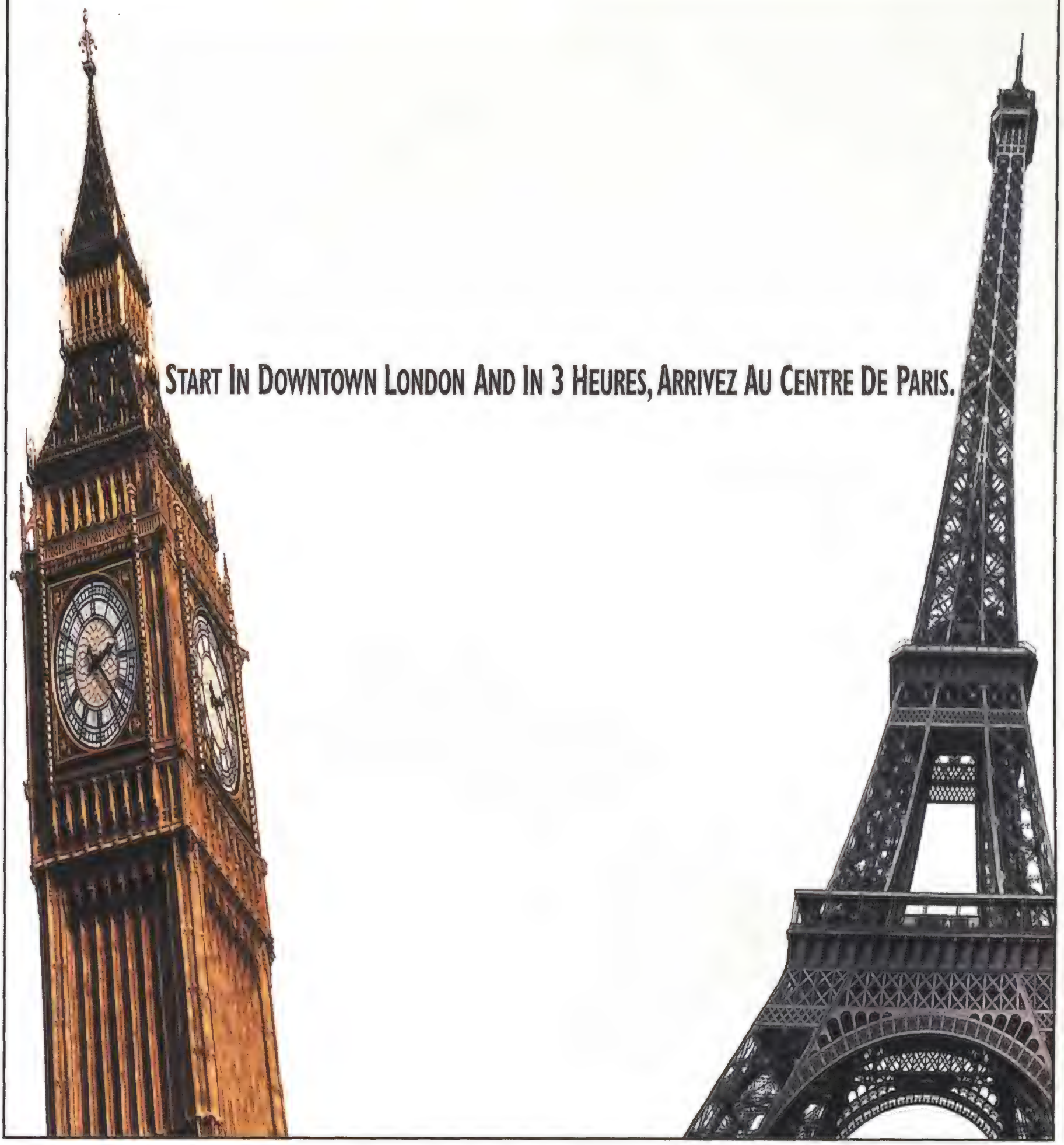
Pollinarium Permanent exhibition examines the means of plant reproduction.

National Museum of American History

Holiday Scrapbook (December 8-January 2, 1996) Display features staff photographs and reminiscences of a variety of holiday season traditions and seven Christmas trees.

Sitting For Justice (runs indefinitely) Exhibit presents objects from the F.W. Woolworth Company store in Greensboro, North Carolina, the site of the historic 1960 sit-in by student protest-

The work of artist Carmen Lomas Garza, on view at the Hirshhorn, celebrates the Mexican-American traditions of her childhood. Here, *Birthday Party Barbecue* (1993).



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ers refused service at the lunch counter.
Science in American Life Permanent exhibition traces advances and discoveries in science over the past 125 years.
World War II GI: The American Soldier's Experience Permanent exhibit offers a firsthand look at the U.S. military.

National Postal Museum
Located next to Union Station on Capitol Hill, the museum presents exhibits that track the history of the nation's mail service.
Stamps & Stories (through April 1996) The stories behind the first stamp to picture an airplane, the first Christmas stamp and others.

Arthur M. Sackler Gallery
Painted Prayers (through April 7, 1996) Photographs by Stephen P. Huyler document ritual paintings executed by Indian women on the walls of their homes.
The Power of the Pen: Islamic Calligraphy in the 14th Century (through May 27, 1996) Folios, manuscripts, book covers.
Traders and Raiders on China's Northern Frontier (through September 2, 1996) Artifacts from the first millennium B.C. shed light on the relationship between China's urban dwellers and the nomadic, pastoral neighbors to the north.

Freer Gallery of Art
The Life of a Japanese Painting (December 17-August 4, 1996) Exhibition of recently conserved paintings explores issues of repairing rare works on delicate silk or paper.
Seto and Mino Ceramics (opens December 17) Exhibit showcases the innovative and influential glazed ceramics of the adjacent Seto and Mino regions of central Japan; pieces span 1,200 years.
Female Imagery in Indian Painting (December 23 - September 1996) Paintings produced between the 15th and 19th centuries include images of the Hindu goddess Kali and the Virgin Mary.
On the River (through January 1, 1996) Hanging scrolls, panels, handscrolls, album leaves and fans illustrate everyday life along a river in China.

National Museum of African Art
The Ancient Nubian City of Kerma, 2500 - 1500 B.C. (runs indefinitely) Show celebrates the artistic traditions of Kerma, capital of the kingdom known as Kush.
Art from the Forge (through March 3, 1996) Jewelry, ceremonial armor and furnishings made by the Tuareg and Moor peoples of West and North Africa.
Three Explorations: Yoruba, Temne, and Baga (through March 3, 1996) Exhibit presents three recent acquisitions—a Yoruba mask, a Temne female figure and a Baga ritual object.

Color Block #58 (1994) by quilt artist Nancy Crow is in Renwick Gallery show.

Hirshhorn Museum & Sculpture Garden
The Collection in Context: Thomas Eakins' Portrait of Frank Hamilton Cushing (through January 7, 1996) Exhibit examines Eakins' 1895 life-size portrait of Cushing, a Smithsonian ethnologist.
Stephan Balkenhol: Sculptures and Drawings (through January 15, 1996) Painted wood heads, figures and animals by the contemporary German sculptor.
Directions—Carmen Lomas Garza (through February 18, 1996) Paintings, mixed-media works, by the San Francisco-based artist present powerful visual narratives of Mexican-American life.

Arts and Industries Building
Equal Rights and Justice (through March 3, 1996) Exhibition organized by the High Museum of Art in Atlanta and presented by the Smithsonian's Center for African American History and Culture features contemporary art inspired by events in the civil-rights movement.

Discovery Theater
The Road Show (December 2) *Care Tales* (December 9) *When Animals Could Talk* (December 16) *The Snowman* (November 20-December 30) Live theater for young audiences. For information, showtimes, ticket prices and reservations, call (202) 357-1500 (voice or TTY).

National Portrait Gallery
Cecilia Beaux and the Art of Portraiture (through January 28) Retrospective features the work of Cecilia Beaux, one of America's most sought-after portrait painters at the turn of the century.
From Truman to Clinton: Presidents on Time (through July 21, 1996) Portraits drawn from the gallery's collection of original *Time* magazine cover art.

National Museum of American Art
Gilded Age Watercolors and Pastels from the National Museum of American Art (December 15-May 27, 1996) Works by such artists as Childe Hassam, John Twachtman and Winslow Homer.
Gene Davis in Black and White: Drawings from the Fifties and Eighties (through January 7, 1996) Black-and-white drawings and collages from the 1950s and '80s by the celebrated "Color Painter."
Metropolitan Lives: The Ashcan Artists and Their New York (through March 17, 1996) Show features such American "Ashcan School" artists as Robert Henri, John Sloan and George Bellows. For images and information, see exhibition's World Wide Web site: http://www.nmaa.si.edu/metlives/ashcan.html.

Renwick Gallery
Nancy Crow: Improvisational Quilts (through January 1, 1996) Exhibit traces the artist's experiments with traditional quilting patterns.
Rick Dillingham: A Retrospective (through January 1, 1996) Works rendered in the artist's unique ceramic style were inspired by his experience with archaeology and architectural forms.

Anacostia Museum
Southern City, National Ambition: The Growth of Early Washington, D.C., 1800-1860 (through March 3, 1996) A joint presentation with the Octagon Museum, the exhibit includes artifacts, drawings and manuscripts from the early history of the District of Columbia.

Heye Center, National Museum of the American Indian (New York)
Creation's Journey: Masterworks of Native American Identity and Belief (runs indefinitely) First of three inaugural exhibitions showcases objects that date from 3200 B.C. to the present.
This Path We Travel: Celebrations of Contemporary Native American Creativity (through April 8, 1996) Unique collaboration features the talents of 15 contemporary Native American artists—sculpture, performance, poetry, music.

Cooper-Hewitt, National Design Museum (New York)
Gallery Closing The exhibition galleries of the museum are closed to the public for renovation for about one year. The project will integrate the museum's three buildings, create a study center and improve access for the handicapped.

Archives of American Art (1285 Avenue of the Americas, New York)
Lilla Cabot Perry and Women Artists at the Turn of the Century (through January 26, 1996) Display features papers belonging to such artists as Cecilia Beaux, Violet Oakley and Mary Cassatt.

Exhibition Catalogs

Catalogs available currently include:
Itchiku Tsujigahana ($39.95 paper)
Ocean Planet ($29.99/$14.99 paper)
Cecilia Beaux and the Art of Portraiture ($29.95)
Metropolitan Lives: The Ashcan Artists and Their New York ($50/$35 paper)
Nancy Crow: Improvisational Quilts ($18.95 paper)
To order, send check or money order to Smithsonian Museum Shops, P.O. Box 1140, Newington, Virginia 22122. Include 15 percent of purchase to cover postage, handling (minimum, $4.50).

Smithsonian on the Air

Folk Masters Join host Nick Spitzer and masters of traditional American music for the Radio Smithsonian series. Programs this month feature New Orleans jazz, black gospel and Polish polka music. Check local public radio listings. For a free copy of the *Folk Masters Listener's Guide* write: Office of Telecommunications, Smithsonian Institution, American History Building, MRC 645, Washington, D.C. 20560.

The Smithsonian Associates, Resident Program

To become a member, or for fee and ticket information, call (202) 357-3030.
December events include:
Sicily: A Legacy of Treasures (December 9; 10 A.M.-5 P.M.) Seminar looks at Sicily's rich architectural and artistic heritage.
Kristin Lavransdatter: A Film by Liv Ullmann (December 18; 7 P.M.) Washington premiere of the epic love story.

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some December exhibits:
• Chicago, Illinois (December 9 - March 17, 1996) *Beyond Category: The Musical Genius of Duke Ellington*, DuSable Museum of African American History.
• Los Angeles, California (December 16 - March 31, 1996) *The Tongass: Alaska's Magnificent Rain Forest*, Natural History Museum of Los Angeles.

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Highlights Continued

European visions of the Middle East

Birthplace of Christianity, Islam and Judaism; cradle of great civilizations; domain of exotic cultures, compelling landscapes and grandiose architecture —the lands known today as the Middle East have held a singular and enduring allure for the West since ancient times.

Sparked by an increase in trade, diplomacy and tourism, European interest in the region escalated dramatically in the 19th century. Napoleon Bonaparte's invasion of Egypt in 1798 opened the door to an expanded European presence in the Middle East, and an eclectic influx of adventurers, archaeologists, engineers, explorers, scientists, soldiers, traders, pilgrims and artists soon followed. The accounts and images these visitors sent home caught the timelessness of past civilizations and provided a window on a strange and mysterious world. Firing the Western imagination, these portrayals had a profound impact on 19th-century art, literature, theater and music.

A selection of watercolors and drawings that chronicle the Western experience of Middle Eastern lands and cultures can be seen at the S. Dillon Ripley Center's International Gallery through January 1, 1996. Presented by the Smithsonian Institution Traveling Exhibition Service, "Voyages and Visions: Nineteenth-Century European Images of the Middle East from the Victoria and Albert Museum" features works from the famed Searight collection.
Diane M. Bolz

Detail from watercolor (c. 1818) depicts the temple of Rameses II at Abu Simbel.

Armenian Woman, Istanbul is one of 21 costume studies done by William Page.

Late 16th-century view of Cairo (detail), as seen from Giza, is also in the show.

John Frederick Lewis captured local dress in *Scene in a Cairo Bazaar* (detail).

Dramatic rendering of ruins of the Temple of Artemis in Sardis (c. 1835) by painter Clarkson Frederick Stanfield was based on a sketch by an amateur artist.

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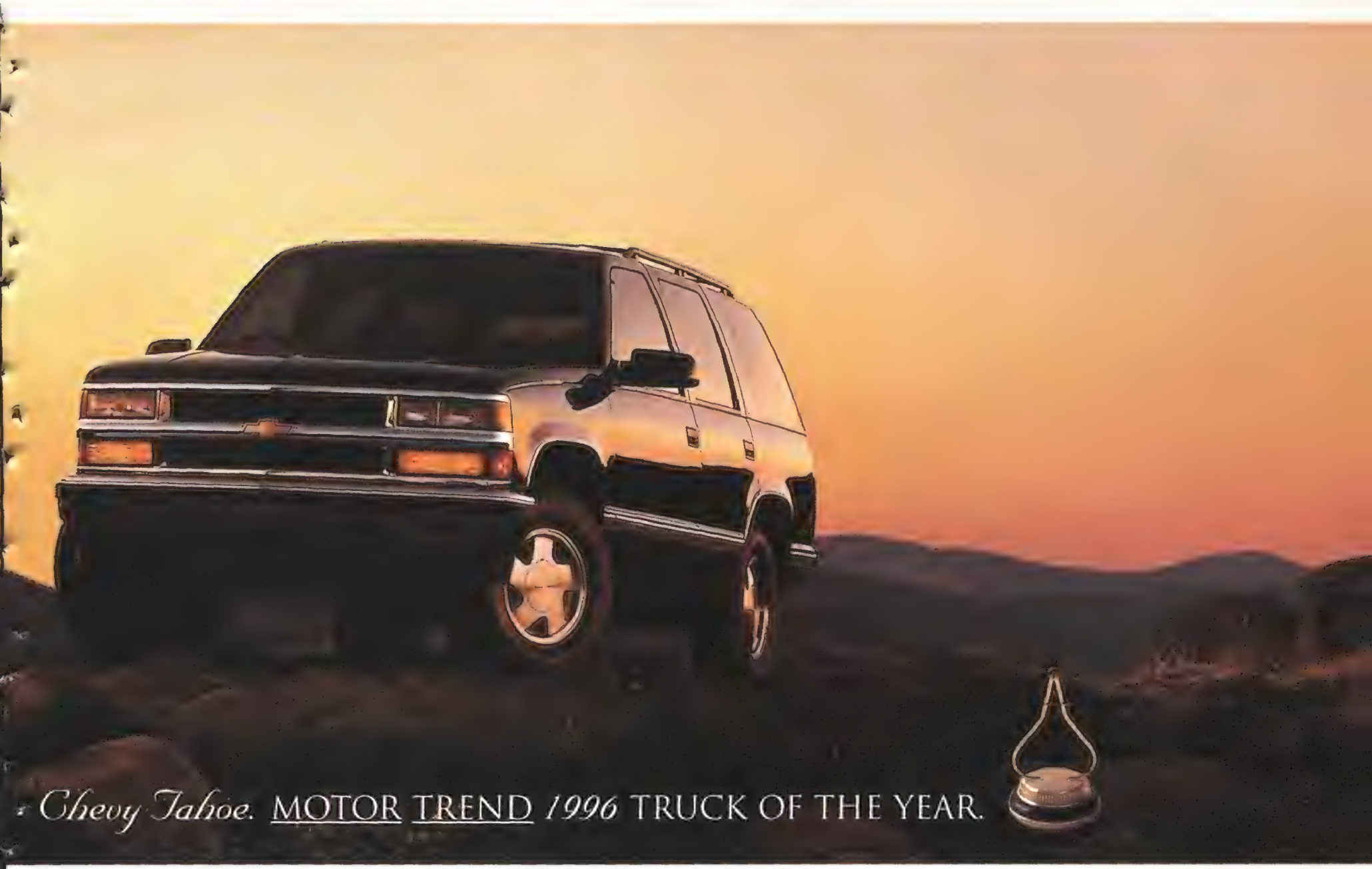

Chevy Tahoe. MOTOR TREND *1996* TRUCK OF THE YEAR.

its interior "positively decadent." In fact, they found nothing else was like Tahoe. So they gave it their highest award.

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REPAIR
REPAIR

By James Trefil

How the body defends itself from the risky business of living

Our cells take trillions of 'hits' each day from toxins both natural and man-made, but hardworking enzymes repair the damage

Bruce Ames argues that fruits and vegetables are full of natural poisons—but they're still good for us.

The judges at my table were nervous, casting furtive glances at a small, pleasant-looking man across the room.

"Is Bruce eating his cheesecake?" one asked.

Another glance. "Yes."

Smiles appeared around the table, and we all started in on our desserts.

This follow-the-leader took place at a science workshop for federal judges—the men and women around the table represented some of the best legal minds in the country. The man whose actions were being so closely watched was my fellow lecturer, Bruce Ames, a professor of molecular and cellular biology at the University of California at Berkeley. He has taken the controversial position that the toxins naturally present in our food and elsewhere add up to thousands of times the quantities of man-made toxins we are exposed to, especially the pesticides used on the fruits and vegetables we eat. It is a waste of time to worry about the latter, he says; our bodies can handle most anything nature or we can throw at them. The cells in our body, he tells us, live in a continuous barrage of damaging molecules. Every cell takes a "hit," as he calls it, about every ten seconds. In the time that it takes you to read this article, your body will have been assaulted tens of trillions of times.

Most of the damaging molecules are inescapable byproducts of the chemical processes in our bodies that enable us to live. Others are toxins, natural and man-made, that we take in. ("The world is full of poisons," Ames says, "but it doesn't make any difference.") Still other damage is done by radiation, whether the ultraviolet component of sunlight or the x rays that produce the diagnostic images ordered by physicians.

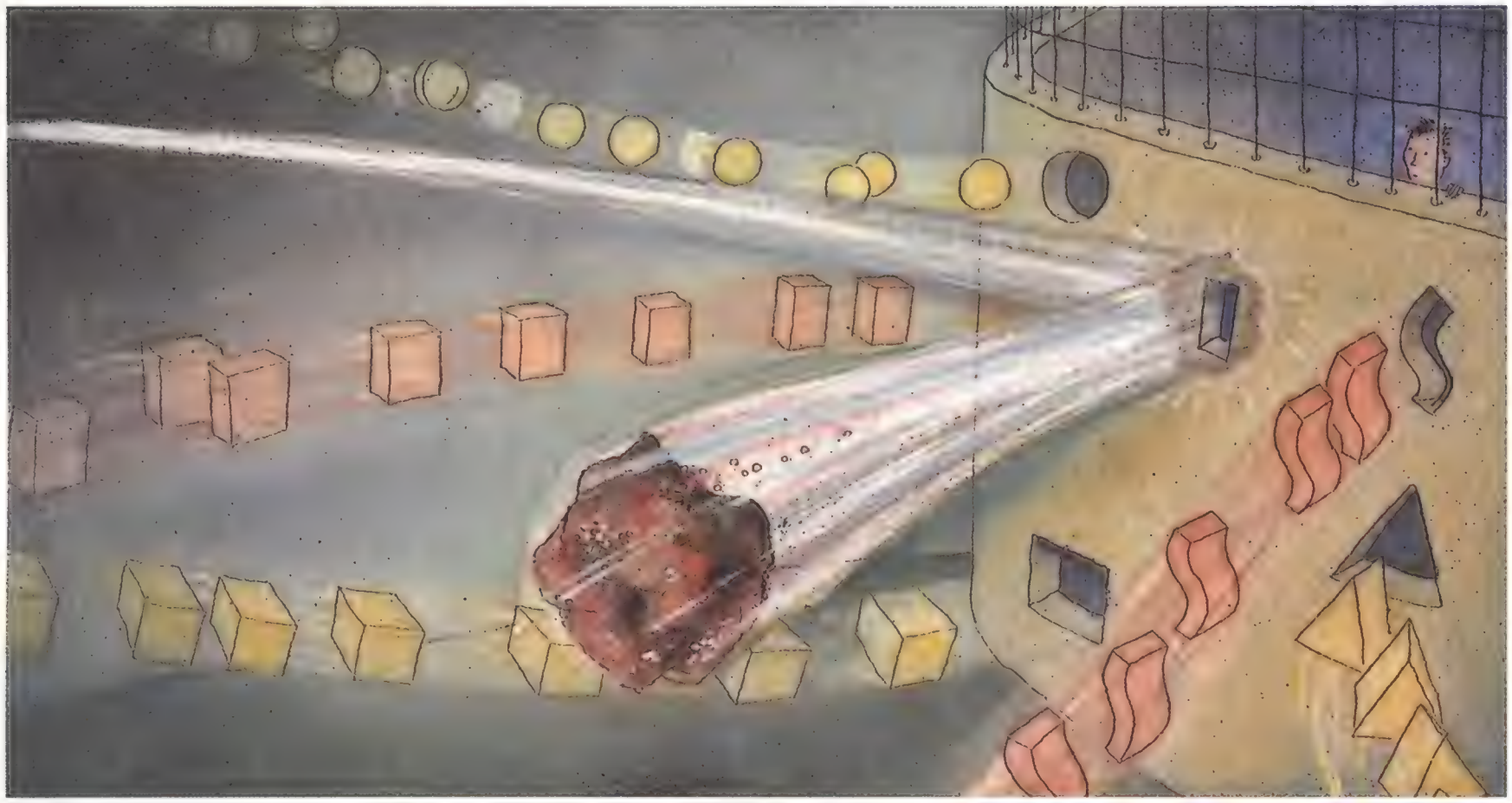
Ames' contention that it is a waste of time to worry about man-made pesticides, air pollution and all the rest is by no means universally accepted by scientists—and certainly not by consumers. But his research on cancer and aging is widely respected. His findings add strength to long-held theories about how well cells repair themselves and offer a better understanding of how we can best evaluate the risks we face.

Right now, the 60 trillion or so cells in your body are going quietly about their business, churning out the chemicals needed to keep you alive. In your pancreas, for example, cells are producing insulin and pumping it into your bloodstream. Your thyroid is producing chemicals that govern your metabolism. Your bone marrow and thymus gland are producing antibodies to ward off

Once a damaged section of the helical DNA strand is removed, specialized enzymes arrive to rebuild it.

Illustrations by John S. Dykes

RISK: the second of a two-part series



The membranes that protect both the cell and the nucleus inside it will not allow strange molecules to pass. Only those molecules with the right shape (and that the cell needs) are permitted to enter.

disease. In all of these cells, the key step in the chemical process is the building up and tearing down of specific molecules to extract energy and useful materials from them. Some of the end products, such as insulin, are exported from the cell to be used elsewhere. Some are used to run the chemical reactions inside the cell, others to replenish and repair the cell itself. In most cells, thousands of these chemical reactions are going on at any given moment, each affecting you in some way.

The facilitators of these life-sustaining reactions are proteins called enzymes. For every one of the thousands of chemical reactions that go on in each cell in your body, there is one specific enzyme—one molecule with just the right intricate shape to bring two other molecules together and let them form bonds. The processes of life depend crucially on the right enzymes being present. Where do they come from? The blueprints for making the enzymes that run the cell's chemistry are contained in the molecules we call DNA. From these blueprints the cells make the enzymes, and the enzymes drive the chemical reactions that make us what we are.

Under normal circumstances, the process of translating the information on the DNA into enzymes goes smoothly. But, life being what it is, this complex machinery sometimes breaks down. If the enzymes are flawed, they can seriously hamper the cell's function, perhaps even kill it. Cells die and are replaced all the time.

If, however, the damage is to the DNA itself, the situation is potentially more serious. Alteration of the DNA will not only affect the cell in which it occurs, but when that cell divides, the defective blueprint will be passed on to all the descendants of that cell. And if that defect changes the shape of an enzyme that drives a crucial chemical reaction, the consequences for the organism can be serious.

By far the easiest way for this damage to occur is for other molecules to interact with DNA and upset its complex structure. Where do these "killer" molecules come from? Bruce Ames' research shows that the overwhelming majority are byproducts of the normal process by which cells turn food into energy. They have been around since life began. If cells couldn't repair damage to their DNA, Adam and Eve would have died when they ate that first apple, and none of us would be here today. Somehow our cells learned to deal with chemical damage to DNA. It is the details of how these mechanisms work—and how *much* they work—that molecular biologists are starting to sort out.

The double-helix shape of the DNA molecule is now familiar to everyone. You can think of this shape as a twisted ladder in which the rungs (which chemists call "base pairs") keep the two sides of the helix from drift-

James Trefil, the Clarence J. Robinson Professor of Physics at George Mason University, eats his fruits and vegetables in Fairfax, Virginia.

ing apart. Here and there along the helix are segments of DNA known as genes, where the information about building enzymes is stored. Each gene carries the information needed to assemble one enzyme and hence the ability to control one chemical reaction in the cell. In humans, there are about 80,000 genes. Every single living thing on Earth uses this same DNA molecule and the same code to carry out the business of living. But just as a single code, like the English alphabet, can be used to write an infinite variety of messages, so too can the genetic code be used to "write" everything from a blade of grass to a Nobel laureate.

By far the most common source of damage to DNA is a class of chemicals known as oxidants. When your cells burn the material in food to supply energy, byproducts are produced, including some familiar substances, such as hydrogen peroxide, and some less-familiar substances with names like "superoxide" and "hydroxyl radical." These are active chemicals—they like to combine with other molecules in reactions chemists call oxidation. It is because oxidants do so much of the damage that scientists such as Ames urge people to eat lots of fruits and vegetables, the foods that contain antioxidants. Ames believes they help reduce the body's risks to not only cancer but cardiovascular disease, immune system diseases, cataracts and brain dysfunction.

When active molecules attach themselves to the bases in the rungs of the DNA ladder, they change the effective shape of the structure. This means that they introduce the possibility that when the DNA duplicates itself, the base pairs in the copy will be different from the pairs in the original. This is what causes mutation. The DNA in all later generations will have the wrong code, and this could eventually lead to cancer. Cells must have some way of preventing this sort of mistake from being propagated.

The way cells do this illustrates the engineering concept of "defense in depth." First, the places where oxidants are produced tend to be located in the body of the cell, while the DNA is segregated in the nucleus. So damaging molecules have to travel some distance to get at the DNA. Second, our food contains antioxidants (vitamins C and E and beta carotene are the most familiar). Third, damaged or dead cells are routinely sloughed off before they have a chance to multiply, so that damage is confined to a single cell's DNA. Finally, even after the damage is done there are ways that the DNA can be repaired.

Complexes of enzymes move constantly along every strand of DNA, searching for trouble. When they find it, they fix it. There are two general types of DNA repair mechanisms, each suited to a specific kind of problem. The one that concerns us most here is called "excision repair" and serves as a jack-of-all-trades for repairing damaged DNA. It swings into action, for example, when benzo[a]pyrene damages DNA. This is one of the compounds in cigarette smoke that can cause lung cancer. When this very large molecule attaches itself to one side of a rung, it distorts the helix; so when it comes time for the helix to split apart and replicate itself, random bases are edited into the new strand, thus creating mutation. The excision repair enzyme snips out the faulty section of the helix so that the gap can be rebuilt with the correct order of bases.

The other repair mechanism is "mismatch repair," which occurs as the helix duplicates itself prior to cell division. It may be, for example, that the two sides of a rung on the DNA ladder get made from the wrong bases or that one side of the ladder slips down a little bit with respect to the other. When this happens, characteristic lumps of mismatched bases and unpaired bases appear on the helix; these lumps are recognized by the repair enzymes. In most cases the molecule that is creating the new strand of DNA, the polymerase enzyme, is actively correcting its own errors as it works—proofreading, so to speak. When bases are not properly paired, it pulls them apart and fills in the correct base molecules in the new strand.

But when the polymerase misses an error, the mis-

Repair enzymes constantly patrol the six feet of DNA in each of our 60 trillion cells, looking for damage.

By capturing and weighing the debris from damaged DNA, scientists can measure the rate of repair.

match repair enzyme goes to work. Its first order of business is to unwind the DNA strands and determine which strand is the new one and therefore has the incorrect base. It then makes a cut in the new strand and removes all the bases back to the original error. The polymerase enzyme then returns and fills in the gap. To date, scientists have been unable to find any kind of DNA damage that cannot be repaired by these two mechanisms.

The general nature of DNA repair is the key to Ames' arguments. If you eat something that contains a molecule you've never encountered before (a new pesticide, for example), your cells don't have to start from scratch to organize a defense. They will simply react to it as they would to any other molecule that doesn't belong and, as a last resort, repair any DNA that it damages. General defenses give us a great deal of flexibility.

Working at the limits of measurement

Scientists like Bruce Ames monitor DNA repair by analyzing the debris that is discarded when damaged portions of DNA are snipped out. Eventually, many of these fragments are removed from the cell and leave the body by way of the urine. The amount of any given compound will be very small, and it is only in the past decade that scientists have acquired the ability to detect such small concentrations. But the general advance in analytical ability that has allowed us to detect environmental pollution at the level of parts per billion also allows us to measure these infinitesimal quantities of DNA repair byproducts and thereby estimate the volume of repairs going on in our bodies.

It is much easier to describe this kind of work than to actually do it. You need imagination and creativity (to know what to measure) and an almost fanatical attention to detail (to make the measurement). Ames enjoys the reputation he does because he has both qualities to an unusual degree. He is a "scientist's scientist."

When I asked why the cell was able to snip out damaged sections and make repairs, his reply surprised me. Instead of quoting up-to-the-minute biological theory, his answer went back more than a hundred years to Charles Darwin and evolution. Taking his current research on natural plant pesticides as an example, he pointed out: "Every plant has 40 or 50 pesticides it makes to kill off predators and fungi. They couldn't survive if they weren't filled with toxic chemicals. They don't have teeth and claws, and they can't run away. So throughout evolution they've been making newer and nastier pesticides. They're better chemists than Dow and Monsanto."

Human beings and other animals have evolved in a world in which not only do their own bodies produce damaging oxidants, but their main food supply is

loaded with potentially deadly chemicals. The laws of natural selection dictate that in such a situation we would either develop ways of dealing with these toxins or lose the evolutionary battle to someone who did. Furthermore, the defenses would have to be general—otherwise we'd be at risk every time a plant evolved a slightly new version of an old pesticide.

By and large, we've been very successful at countering nature's attempts to kill us off. We've not been completely successful, though, as the occasional newspaper stories about someone dying from eating mushrooms illustrate. So there are some reminders in our daily lives of the long chemical battle between our cells, as they seek energy from plants, and the plants themselves, seeking to keep from being eaten.

Seen this way, the layered defenses of the human cell make sense, as do the busy enzymes patrolling the DNA: we needed them to survive as plants became better at self-defense. But if you're going to invoke Darwin to explain one thing about the cell, you're going to have to follow through and see what he has to say about other things as well. For example, it's true that the human body is a marvelous machine, designed to survive and prosper in a hostile world. In an evolutionary sense, the purpose of this marvelous machine is to reproduce—to place its genes in the next generation. Once this has been done, there is no evolutionary advantage for keeping the organism alive and in good repair. As a middle-aged scientist, I have often brooded on the inequity of this state of affairs, but it remains a basic tenet of evolutionary theory.

The DNA repair mechanisms we've described play a crucial role in keeping us alive. If damage to DNA is allowed to go uncorrected until a cell divides, all succeeding generations of cells will carry the defective blueprint, and the final outcome may be disease or malignant growth. The cell doesn't have forever to effect its repairs, then—it has to do so before the next division. This constraint forces the cell to set priorities in its repair operation, with crucial repairs being done first, others if the opportunity arises.

Repair work is strictly prioritized

First come repairs to genes that are actually being used by the cell. In the pancreas, for instance, the gene that codes for the production of insulin will be first in line. Damage to inactive genes or to other parts of the DNA not in current use will be put off until crucial repairs can be made.

In his studies on rats, Ames finds an interesting pattern to repairs. At any given moment, there may be a million or more damage sites on the DNA in a rat cell. About 100,000 are repaired each day, but a little more than 100,000 new "hits," or lesions, appear. Thus, over time, the uncorrected damage accumulates. There may be, for example, as many as two million DNA lesions in an old rat.

Plants cannot run from those that would eat them, so they have evolved some lethal chemical defenses.

"Is this true in humans as well?" I asked.

"We don't know about humans yet," Ames said. "There are too many variables. You can't put human subjects on a strictly controlled diet. You have to put in a tremendous amount of time to get things worked out in rats first, before you can even think about moving on to humans."

In Ames' view, both the process of aging and the incidence of cancer can be attributed in large part to the accumulation of damage to DNA. "Most [researchers] think that both aging and cancer have something to do with damage to DNA," he says. "Cancer is a disease whose rate increases with age."

There is evidence to back up this view of aging and cancer. Measurements of repair rates show that small mammals have a much higher number of hits to their DNA than do humans. Rats and mice, for example, seem to be making 100,000 repairs to each of their cells per day (versus 10,000 for humans). These rodents live only a few years and are typically full of tumors when they die.

In addition, there is strong evidence that many (if not most) human cancers are related to processes that stimulate the division of cells. The most striking example of this phenomenon is the constant irritation of lung tissue

When the repair forces can no longer keep up with the damage occurring, we experience what we call aging.

from smoking, but there are many others, including the effect of alcohol on the liver and other chronic irritations and inflammations. The more often cells divide, the shorter the time there is for repairs to be made and the more likely it is that a mutation will occur.

DNA repair is more than a fascinating science story. Its ramifications spill over into the politics of our everyday lives, and Ames has never hesitated to make the leap from laboratory to public arena. Back in the 1960s, he developed the Ames test, an elegant, simple way of determining whether a chemical produced mutations in the DNA of bacteria. It has since become a universal screening technique for potential carcinogens. Ames never patented—or made a nickel from—his test. "In those days, people didn't worry about things like that," he says. "Besides, I wouldn't have any way to spend the money. Going to scientific meetings provides all the travel I want." (A new version of the Ames test is about to be patented, however, at the insistence of the University of California.)

When the cancer-causing potential of chemicals was first recognized, attention turned to man-made compounds, such as pesticides. Tests on animals established that about half of the synthetic materials tested could, indeed, produce cancer in rodents. The human race suddenly found itself awash in a sea of apparently carcinogenic chemicals. In the 1970s Ames himself was arguing that humans should not be exposed to even one molecule of any substance that causes mutations in bacteria.

Little attention had been paid to natural pesticides. Ames and his colleagues began to look at the chemicals naturally present in foods from the plant kingdom, and they found that half of them caused cancer in rodents—a proportion similar to that of synthetic chemicals. By the late 1980s Ames had reversed himself, and the group began ranking suspected carcinogens by an index that relates cancer caused in rats to the risk for humans. In the process, he began to question the massive doses given rodents in animal cancer tests. It had become standard to submit animals to the maximum tolerated dose (the most a rodent can ingest without dying). Ames and others now believe that megadoses of anything accelerate cell division, and this in itself leads to cancer. For that reason, they feel, the results from rodent tests cannot be extrapolated to the low, everyday doses to which human beings are exposed.

Today in his lab Ames tells me, "Almost every plant product in the supermarket is likely to contain natural carcinogens." He estimates that an American eats about a gram and a half of these natural pesticides every day—10,000 times more than the residues of man-made agricultural pesticides ingested. In other words, about 99.99 percent of the pesticides we take in every day are natural, only 0.01 percent are man-made. "For example, when you eat cabbage, you ingest 49 different natural pesticides and metabolites," Ames says with that same disarming smile, and goes on to produce a list of 43 foods that contain at least ten parts per million of chemicals that are carcinogenic in rodent tests. Ranging from anise to lettuce, the list even includes parsley, sage, rosemary and thyme. Even a cup of coffee doesn't escape his attention. "There are over a thousand chemicals in a cup of coffee," he says. "We've tested 26 of them, and half of those cause cancer in rats."

"Life is full of 'one in a hundred thousand' risks," Ames states. "If the EPA is spending all its time trying to protect the public against 'one in a million' hypothetical risks—which it is doing to a large extent—it's spending its time on trivia. We're spending $150 billion a year trying to control pollution. Although much of this is useful, I think it will have little influence on cancer rates" (SMITHSONIAN, November 1995).

At bottom Ames, the consummate scientist, wants Americans to recognize *all* the risks in their lives and adopt a rational approach to controlling them. Instead of worrying about a minor (and perhaps even nonexistent) risk, we should think about eliminating major causes of cancer. What are these causes? Ames ticks them off on his fingers: "First, of course, is smoking. Then there is the lack of fruits and vegetables in the diet. And, finally, chronic infections."

Needless to say, Ames' views have not gone unchal-

lenged. One critic is Bailus Walker jr. He is a professor of environmental and occupational toxicology at Howard University Cancer Center in Washington, D.C. He says: "You've got to look at total exposure to everything that the body receives through the air, the food, the water. We can no longer look at these pieces in isolation. We've got to look at the total load."

Others argue that human beings, through the process of evolution, have gotten used to metabolizing natural toxins but haven't yet had time to develop similar defenses against man-made chemicals. Ames responds that there is no chemical difference between the actions of synthetic and natural substances in the cell. An oxidant is an oxidant, regardless of its source, and the general nature of the cell's defenses can handle both. "To a toxicologist, the idea that nature is benign and only man-made things are bad is crazy," he says. To back up this statement, he points out that "most humans are eating plants their ancestors did not—for example, cocoa, tea, potatoes, tomatoes, corn, avocados, mangoes, olives and kiwi fruit." There simply hasn't been time for the human body to adapt to all of the new natural pesticides in these foods, he argues, so the fact that they are considered safe is evidence for the efficacy of the cell's general defenses.

These sorts of arguments have won many scientists over. James Duke, of the National Germplasm Resources Laboratory, part of the U.S. Department of Agriculture, was once one of Ames' harshest critics but changed his view as new information came in. "I have come around to believe him," Duke says, and then goes on to note that his own work on natural pesticides suggests that "Ames may be understating his case." Looking at oregano, for example, Duke finds that there is 100,000 times as much natural pesticide present as there is synthetic pesticide residue.

The new vision of the dynamic, self-repairing cell is going to force not only scientists but policymakers as well to rethink their ideas. But what direction is there for the rest of us? How can we go about controlling the risks in our diet in the face of the sort of media hoopla we encounter all the time? I ask Bruce Ames how he would answer these questions.

"Don't smoke at all," he says. "If you drink, drink moderately. Eat a balanced diet, with lots of fruits and vegetables." Then, with a smile, he adds: "Just do what your mother told you."

For long and healthy lives, biochemist Ames suggests that we just follow the prescriptions of Dr. Mom.

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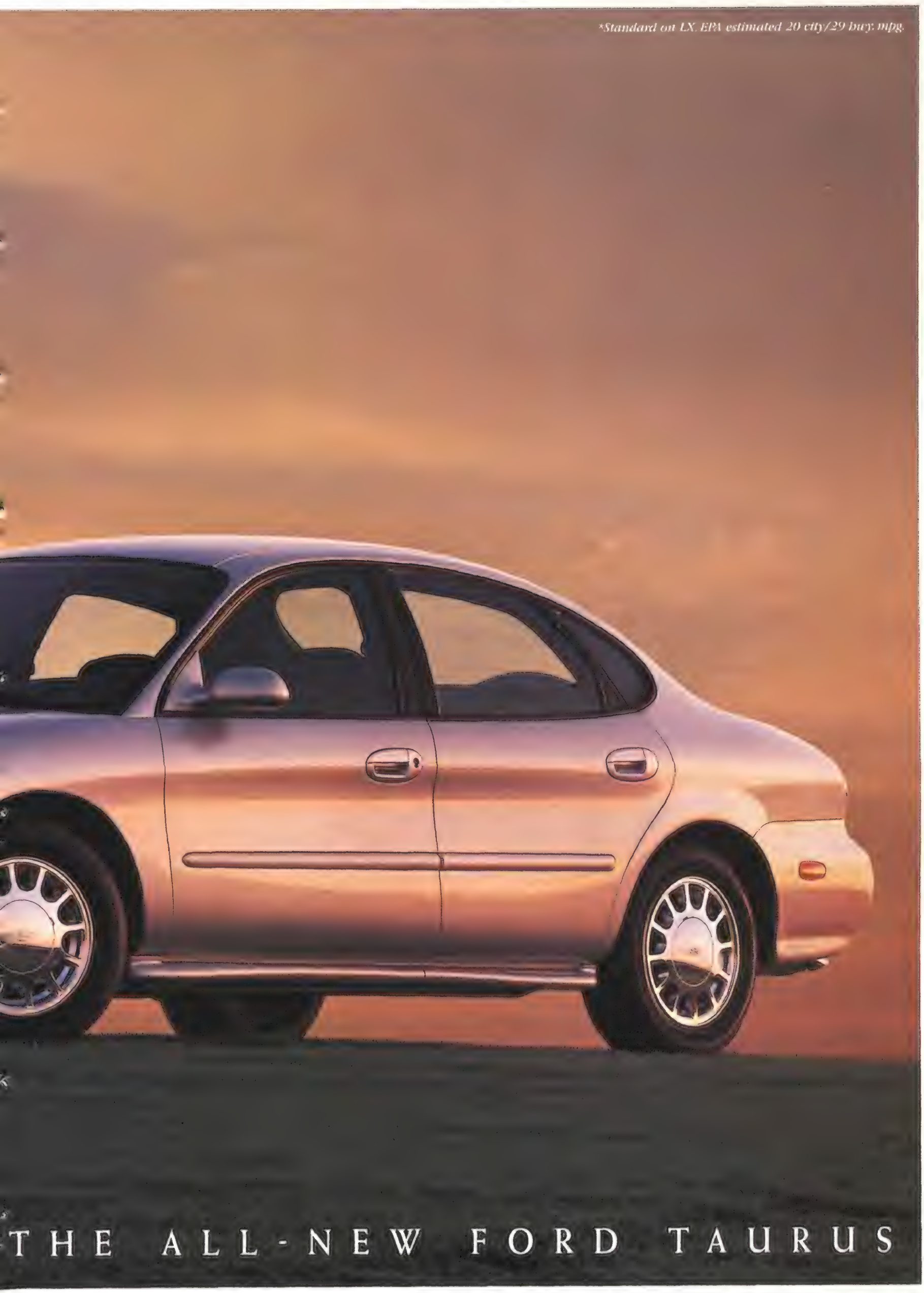

THE ALL-NEW FORD TAURUS

A B-26 medium bomber used on missions over Germany was one of some 30,000 planes sold off as "flyable."

By James R. Chiles

How the great war on war surplus got won—or lost

Getting rid of $34 billion worth of old ships, planes and guns, not to mention seven million tubes of toothpaste, was no picnic

In the closing scene of *Raiders of the Lost Ark*, a clerk rolls the crated Ark of the Covenant into a military depot for storage. The camera slowly tilts up to follow the clerk, showing the vast scale of the warehouse stacked with crates stretching away and away into the hazy distance. The scene drew gasps from theater audiences. But the fact is that no silver screen could ever be big enough to show—or even suggest—the true scale of the goods produced during that era for World War II or how much surplus remained following Japan's surrender. To buy supplies and equipment for the war, the United States spent three times more than the entire gross national product of 1940.

In our day, when even city budgets come in billions, it's hard to convey with figures what an enormous amount of wealth this was. It bought 299,000 airplanes, 1,300 war production plants and 5,400 cargo ships. And every soldier overseas—some 3 million of the 16 million Americans in the Armed Forces—needed a good-sized pile of food, supplies, ammunition and machinery.

Waiting to be scrapped, Curtiss P-40 pursuit planes, which had been replaced by faster and better-armed aircraft before the war ended, were stacked by the thousands at this air base in Walnut Ridge, Arkansas.

Through lend-lease we also supplied many Allied troops. On the day Germany signed the armistice, the American Armed Forces found themselves surrounded by 24 million tons of supplies in Europe. By rough estimate, when Japan gave up on August 14, 1945, there was more war stuff in stockpile than four years of combat had consumed. The shooting was over, but another battle was about to begin: America's war on war surplus.

The three-year war on surplus would take a heavy toll on bureaucrats. Twenty-six separate Congressional committees would summon them to the Capitol for grillings on subjects ranging from the sale of icemaking machines to Yugoslavia, to inventory costs for Army screwdrivers. We fought this enemy by selling it, scrapping it, giving it away and dumping it in the ocean. We even dropped atomic bombs on it. Some goods escaped the onslaught, however, and can be found today in the hands of proud collectors. But the public was never happy; at one point the surplus-disposal agency was logging 7,500 letters of complaint a day. Industrialist and Presidential adviser Bernard Baruch had foreseen it all. "Whatever you do," he told one of the first surplus czars, "it ain't goin' to be no good; and if you did the opposite, it also ain't goin' to be no good. . . . When in doubt, sell."

The surplus story begins in August 1945. At that time, just before the V-J Day surrender, the Armed Forces were poised for an invasion of Japan expected to require at least another six to eight months. Field commanders had been in the habit of taking some care of equipment. But after two atomic bombs brought the fighting to a close, the machinery of war suddenly lost its luster. From Burma to Bremen, the variety and volume of the war's leftovers stretched beyond the most productive imagination. Over and above what the Armed Forces would conceivably need for postwar duty, there were more than 6,000 oceangoing American vessels, including 1,164 warships and 125,000 trucks. We had 94 chemical and ammunition plants so big that a day's production from a single plant was enough to supply the nation's peacetime TNT requirements for the

Eddie Tarashinsky, one of few war-surplus dealers still in the business, stands with son Rick in the front of his Brooklyn store. He bought cheap and managed to sell everything from gas masks to drawstring pants.

next five years. What was to be done with the 25 million extra folding chairs or the captured German submarine, the U-505? There were 7 million tubes of unsquished toothpaste and 11,800 tons of anti-gas clothing impregnated with a gas-neutralizing chemical that caused wearers to itch vigorously. There were 4.6 million tons of ammunition, 1,800 religious chapels and 21,000 tanks. There were a million gallons of olive drab paint used for camouflage and a million pounds of imported hog bristles for paintbrushes, as well as millions of jars of black camouflage face cream. Some 17,208 drums of gasoline and fuel oil were stranded on a remote peninsula in Alaska. And there was much more.

Of course, nobody knew these numbers at the time because the pace and fury of the war had scrambled supply records. Troops landing supplies on some disputed shore under heavy machine-gun fire were not inclined to walk around with clipboards checking box labels against requisitions; they chucked everything on the beach. Many supplies were still in transit on V-J Day, including 300 Navy freighters loaded with cargo.

But no matter how big the supply, not a single nut or bolt was allowed to be "surplus"—meaning that it was obsolete or more than would be needed in the foreseeable future—until the Army or Navy declared it so. This world-class bottleneck could be dealt with in two ways. Swift destruction (if the material was hazardous) or slow disposal by sale to government agencies and qualifying buyers from the public. The process sounded business-like but depended on many things, beginning with inventory. Think that's easy? The American Armed Forces stocked about four million types of products. The inventory covered great quantities of pesky enemy equipment too, like the U-505 and 112 Japanese submarines.

The author is a regular contributor to SMITHSONIAN. *His grandfather worked for the WAA's Smaller War Plants Corporation, selling surplus bulldozers.*

Barbara Braithwaite, Swiftwater, PA

Margaret Tuthill, Shiprock, NM

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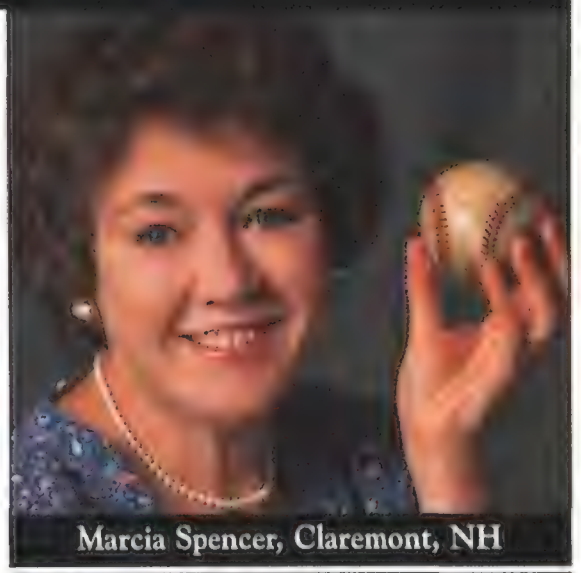

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Capt. J. A. Strong, an Army Air Force officer, ran an inventorying operation in Germany that opened and sorted through 60,000 tons of crated goods in two years. "Every day was Christmas," he says. But many bases did not have the manpower for a box-by-box inventory, particularly in the Pacific. Why? Because the general voting public (not to mention the troops themselves) wanted all the G.I.'s back home—and right now. Wives organized hundreds of "Bring Back Daddy" clubs around the country. A Congressman from Kentucky reported 700 angry letters a day from servicemen and their families. "After the war," recalls Paul Poberezny of Oshkosh, Wisconsin, a pilot for the Army Air Force, "most people just wanted to turn their backs on it."

The official story from a Congressional investigation team that visited Pacific bases was as follows: there *were* no documented cases of flagrant and wasteful destruction. But homecoming veterans told a different story, full of accounts of large-scale burning, burial or dumping of all kinds of usable goods simply to get excess stocks out of the way.

Leslie R. Tinkler, a master sergeant at a Marine service depot on Guam, remembers that "after the tires and anything usable were removed, scores of vehicles got bulldozed over." George Ashton of Maplewood, Minnesota, a Marine driver on Peleliu Island at war's end, says, "Within a couple of days, they were hauling barges full of supplies out to sea and sinking them. We were told there was no way to bring all this stuff back to the States and besides, if we did, the companies making these things wouldn't be able to sell anything."

V-J Day found Marine pilot Bill Cantrell of Springfield, Missouri, stateside, teaching combat flight tactics. Orders arrived to hand over his flight gear, which included a leather flight jacket and a shearling-lined jacket. "Like a good boy, I turned them in," Cantrell says. "The enlisted seaman wrote me a receipt and tossed them over his shoulder to another seaman, who cut the jackets right up the back with a combat knife. The word got around pretty fast. Just say you lost them—and take them home."

Bulldozing supplies amid the general uproar

Army captain John Cunningham watched P-51 Mustangs being tumbled over a cliff on Okinawa, stacking up in a ravine like so many smashed toys. (Mustangs were cheap then; only $51,000 apiece new.) In time rumors arose that a general was coming to investigate, Cunningham recalls, and with every such report bulldozers arrived. Among the supplies thus bulldozed underground were hundreds of crates of equipment for three field hospital units. Before the burial he and his buddies rooted through the crates for useful items, salvaging scissors, pajamas, bathrobes and dental chairs.

Refrigerators were practically a dime a dozen. Cunningham bought his "for a bottle of bonded booze, delivered by the Seabees. When I got back to the States," he says, "I had a hell of a time buying a refrigerator.

"The thing that irked me the most was the thousands of units of blood that had to be thrown away," he adds. "We knew the people back in the States had donated it all. But a good argument was made that to bring it all back cost triple."

Even with thousands of tons of matériel tumbling into oblivion, a great deal of stuff ended up having to be processed through official channels. "The truth is that the Army and Navy are saving, storing and guarding a fearsome lot of junk that any Missouri farmer would dump into the nearest creek," a correspondent for *Time* reported after a close examination of the Pacific bases.

With $34 billion worth of inventory, it was time to get selling. And so we did. The U.S. State Department sold off entire bases—from buildings to the broomsticks inside—in "bulk sales" to friendly foreign governments. The Philippines and Nationalist China bought all the equipment remaining on a long list of Pacific islands. Scrap metal in mountainous quantities went "as is, where is," to contractors like Massey Supply Company, which was run by two brothers in Missouri who had already begun selling surplus boots, scrap canvas and

Robert (Bigjohn) Littlejohn, the WAA's fifth and most-energetic chief, enjoys a rare moment of repose.

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rope. One of the owners, Warren Dean, explains that the Navy, in a hurry to clean up old island bases, gave the Deans 18 months to load up to 141,000 tons of scrap metal, charging them only a dollar per ton. "It sounded pretty good," Dean says, "but everything was 8,000 miles from a steel mill, out in the middle of the ocean." Salvage expenses were hard to predict, too. It cost the Deans $40,000 just to fumigate a shipload of scrap bound for Houston from Guam. Agricultural inspectors had found giant African snails lurking among the load and wanted to take no chances.

Cavalry boots from World War I

The search for surplus to sell (or buy) turned up dusty surprises, like some spare wagon parts bought for the Mexican-American War, which ended in 1848. Tarashinsky Merchandise of Brooklyn, New York, wound up with 150,000 saddles and 90,000 pairs of cavalry boots left over from World War I.

Still, the best selling strategies were not always clear. One group of deep thinkers wanted everything priced for as much as the government could get, even if it took years (or decades) to sell the stuff; another group wanted everything marked down to move, with veterans having first dibs on the bargains. Still others plumped for scrapping or burying most of it—so as not to wipe out the demand for new equipment.

All three groups found something to like in the Surplus Property Act, a wide-angle law that set no fewer than 20 aims and requirements that all surplus administrators must meet. They were to promote family farms, for instance, as well as veteran-owned businesses, foreign trade, full employment, an economical transportation system and many other things. They were to avoid excessive profits, speculation, monopolies and various other mutually incompatible targets.

Five agencies started into the surplus pile, but one, by far the largest, called the War Assets Administration, wound up selling most of the domestic surplus. The WAA's first four chiefs swiftly got out from under, making way in 1946 for a human tornado named Maj. Gen. Robert (Bigjohn) Littlejohn. If anybody could win the war on surplus, people thought, it was Littlejohn. He had been a standout tackle and heavyweight wrestler at West Point, a World War I machine-gunner and, from 1942 through 1945, the Army's chief supply officer for the entire European Theater. "There ain't no hold that can't be broke," Littlejohn liked to say—at least in the early days. Soon this barrel-like man was raging against inventory that arrived in deluges and sold in trickles. He banged desks, he yelled at his managers, he overturned chairs.

Fusillades of criticism did not help his disposition. An outraged Washington newspaper reported that a former Army officer found a way to buy $400,000 worth of surplus textiles from the WAA at the right price, but a disabled veteran couldn't even get approval to buy a typewriter. "Government Property Rots on Okinawa While Those Who Fought There Cannot Get Supplies They Need to Set Up in Business," blared a typical headline in a New York paper. A *Washington Post* headline complained: "Army Makes 60 Veterans Wait All Night in Rain for WAA Sale." Veterans deluged sales offices with requests for the purchase preferences allowed by law. A sale of staff Army cars by the WAA drew 200 veterans' requests for every car available.

The WAA had 4,000 barrage balloons to sell, each the

By late 1945, bombers like these Flying Fortresses and twin-ruddered Liberators were being sold off not one at a time but by airfield lots.

One fortunate old warrior, minus engines, wound up as a gas station in Fort Worth. A few planes got pressed into service as diners.

size of a house. Nobody wanted them. But then employees pulled one out of storage and inflated it as a promotional gimmick to advertise a new WAA sales office in Washington. The tether rope broke and the balloon blundered across the East Coast airways, briefly shutting down air traffic and alerting large numbers of people to the adventure of owning their own balloon. Alas, before the WAA could capitalize on the opportunity, the aviation authorities called up and banned the sales, declaring the balloons a safety hazard.

Unable to sell 17,000 homing pigeons at three Army camps, the WAA offered free birds to anyone who would send in a cage and promise to hold any female pigeons through at least three nesting cycles—so they wouldn't return to camp. Children's publishers promoted the giveaway, but some forgot to mention that cages should be addressed to the Army camps holding pigeons. Homemade cages poured into Washington, piled up in the agency's basement and overflowed into an outdoor storage site at the Treasury Department. Even when goods sold, the WAA had trouble. By mid-1946 it had accumulated $10 million in mystery checks with no idea what the money had been sent in for. The General Accounting Office threatened to shut the doors if the agency couldn't straighten out the situation.

"Army-Navy" stores from coast to coast

Littlejohn plowed ahead and the balance finally began to tip. Some goods were in strong demand already. After the Pittsburgh office of the WAA advertised 400 chests full of tools at a big discount, waves of desperate civilians showed up. Some stormed the building despite the arrival of police. The Dean brothers of Missouri had moved on to discover a bull market for Army khakis that they tagged at $2, one-quarter of the retail price of new pants in 1946. "Number-one chino was hard to come by then," says Warren Dean. "People would come in and buy a dozen pairs of pants at a time." This was the beginning of a boom in small "war surplus" stores, often called "Army-Navy" stores, many of which have lasted until today. Veterans flooded into them for cheap, durable gear. Hundreds of thousands of foul-weather jackets, pup tents, entrenching tools, G.I. blankets and rubber rafts found buyers this way. My Minnesota father-in-law used to comb Army-Navy stores looking for high-quality cold-weather gear for ice-fishing trips.

Americans were starving not just for jackets and denim pants, but for high-tech items like binoculars. "When the war started," recalls Norman Edmund, founder of the Edmund Scientific Company, "the government requisitioned all binoculars in good condition from private hands." With the coming of peace and surplus everything, Edmund's business—selling binocular kits—tripled. "One week I ended up buying seven trailer loads of optics," Edmund says. "I had to store them all over town, using one-car or two-car garages. I ended up renting space in 35 garages." Edmund even snapped up old bombsights; research labs bought them to cannibalize for the precision gears. Schools bought lenses for performing physics experiments.

Across the country, surplus found its way into other niches besides Army-Navy stores. Homeowners as well as service stations bought stainless-steel oxygen tanks to store compressed air on vehicles, providing a quick way to reinflate a flat tire. Even those unwanted barrage balloons finally found a use. Cut into pieces, the neoprene-coated cloth made durable tents, tarps and raincoats.

George Rabuse, 66, a retired Minnesota inventor, holds a 75-millimeter shell from the cannon of a M4A4 Sherman tank that he bought five years ago. Since then, he has been restoring it—with help from neighborhood kibbitzers.

One alert government employee grew suspicious at a sudden wave of requests for 235,000 airman's desalination kits at 40 cents each, ostensibly bought for the plastic bag inside. An assay revealed five ounces of pure silver in each kit, worth more than $1 million at 1947 prices.

A think tank at the WAA suggested converting helmets into wall lamps and flag cases into quivers for bow-and-arrow enthusiasts. In 1945 *Popular Science* noted that "airplane connecting rods need only a little imagination to be converted into beautiful, modern andirons." It also solicited ideas in a contest for its readers. Some entries—like using flamethrowers for clearing brush—would have failed any consumer-safety test, but most suggestions were inspired by a severe shortage of civilian goods. The contest winner proposed to equip an entire civilian airfield with military surplus. Another reader suggested converting a B-29 bomber into a diner; in fact, a diner later opened in Louisville, Kentucky, using the body of a C-54 transport.

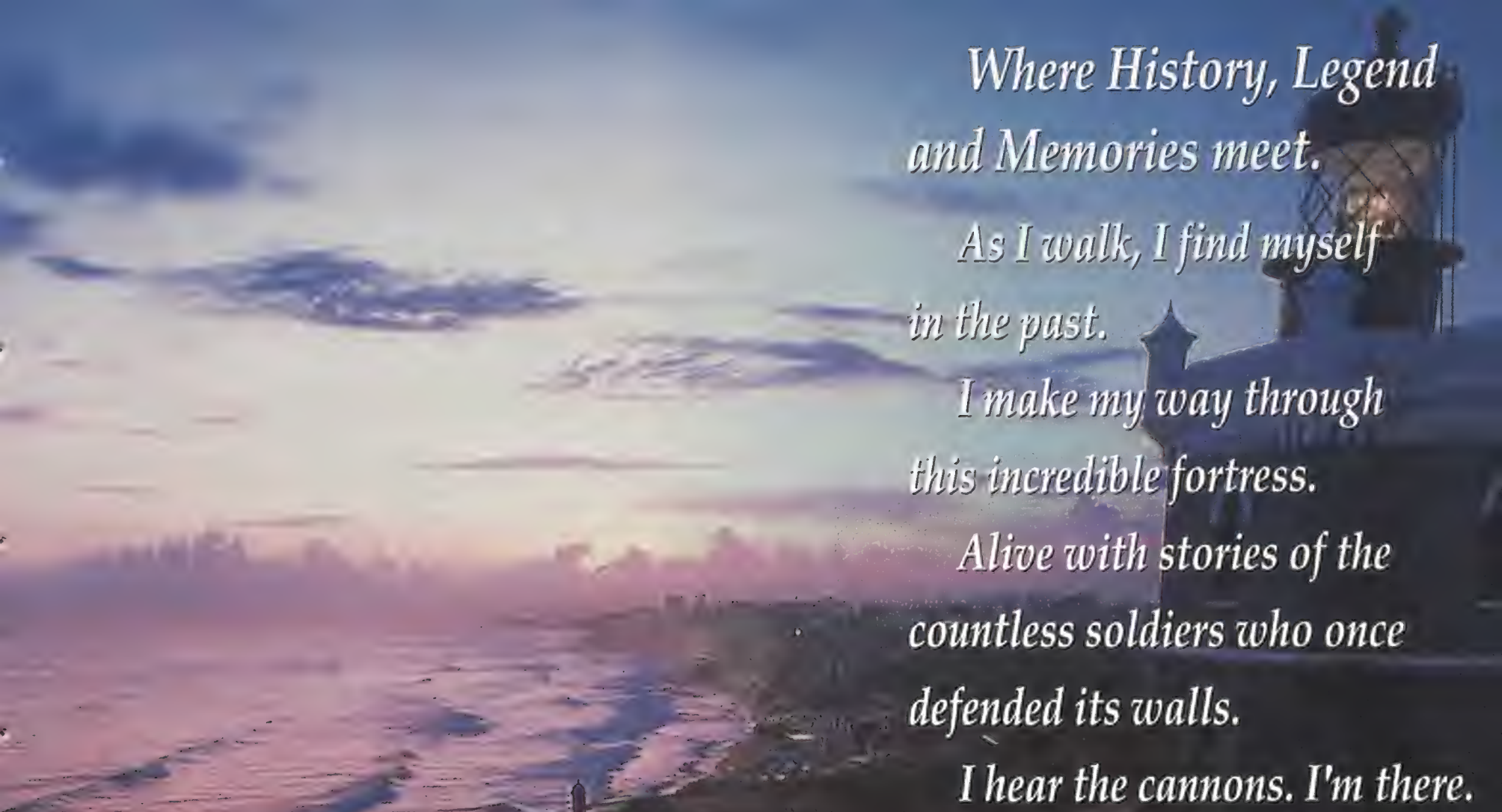
Prefab Quonset huts had all sorts of reincarnations. As a dairy barn in Michigan, for instance, and a movie theater in Colorado. The University of Michigan used nine surplus tank-cars and a barrage balloon to build a supersonic wind tunnel. With Army-surplus electronic instruments, high school students in El Cerrito, California, built a million-electron-volt cyclotron. Gas masks, aircraft tubing and tank periscopes reappeared as parts in children's toys (p. 62). Farm families bought air-raid sirens to summon fathers to supper, and stored corn in cribs made from surplus steel landing mats.

It was not just a matter of asking for bids from surplus dealers, though. Much of the stuff threatened to be the death of the salesmen involved. Faced with 194,000 giant parachute flares, each capable of providing more than a half-million candlepower for two minutes, the WAA ingeniously printed up and sent out thousands of brochures, including mailings to traveling circuses, foreign embassies and freight airlines. Eddie Tarashinsky recalls hours of brainstorming about what to do with what he calls the "dogs," like the gas masks for horses left over from World War I. His family's wholesale surplus company, Tarashinsky Merchandise, is one of only a handful of big surplus outfits that still survive from the postwar boom era. "Nobody would take the quantities we needed to sell," he says. Confronted with thousands of extra pairs of drawstring pants, the company cut them in half and made two bags out of each pair.

"We needed three things in the business then," he says. "The money of Donald Trump and three other multimillionaires. A warehouse the size of Central Park. And lots of patience. We never had all three at once."

According to Robert Jenkins, president of the Military Vehicle Preservation Association, about 10,000 World War II vehicles, mostly Jeeps (SMITHSONIAN, November 1992), are still running. But even armored vehicles got sold into peacetime servitude. Light tanks pulled stumps in Iowa. Clem Neuheisel of Eau Claire, Wisconsin, modified a half-track to haul a fertilizer hopper through muddy fields. A few Sherman tanks found jobs as snowplows and hazardous-duty firefighting vehicles. Some of them came from the incredible armory of Walter Ising, an Illinois metal dealer who bought 536 Shermans from the Rock Island Arsenal in 1958 at $590 each and dismantled the 35-ton vehicles for salable parts.

I located a retired inventor named George Rabuse (above) who bought a Sherman M4A4 in 1990. The tank, an extremely rare 30-cylinder model, had sat in an Argentine scrap dealer's warehouse for more than 35 years. Rabuse's tank is in Minnesota now, under restoration in an oversize garage behind the home of one of



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Sales ingenuity reached some kind of apogee with an attempt to adapt tank periscopes to kiddie-cars.

his sons. Rabuse is busy restoring it both inside and out, to the extent of acquiring every single piece of the regulation equipment, down to tow cables, fire extinguishers, helmets, first-aid box and 25 spare prisms for the tank's periscope. Having spent five years so far on his tank, Rabuse is loathe to commit himself to the "magic day" when it will run on its own again. But the crowd is sure to be large, he says. A network of tank enthusiasts now stops by on Thursday-evening work sessions to swap stories about WWII tank battles, in which the underpowered, thin-skinned Shermans usually took a beating.

When they think of WWII surplus, most people think of vast fields of airplanes in Arizona—and for good reason. They probably have in mind the much photographed Storage Depot 41 at Kingman, Arizona, though it was only one of many storage depots for surplus planes, and not the largest, either.

At Kingman and elsewhere, the WAA offered flyable models at cut-rate prices. In the late 1940s, Lockheed P-38 Lightnings went for $1,250. A few fighter planes were converted into air-racing models. Hollywood pilot Paul Mantz bought 475 surplus planes for $55,000, including 228 B-24 Liberator bombers and a transcontinental-record-setting P-51 Mustang. He saved a few for rental to filmmakers and sold the remainder for scrap at a profit. Two B-29s did high-altitude research work for California physicists; another served as a TV station for a 1948 experiment in wide-area broadcasting. Rugged B-17s often turned up as crash-test airplanes for the military, and some as water-bombers for the Forest Service. One Flying Fortress ended up delivering telephone poles on remote South American landing strips; the poles were loaded and unloaded through a hole in the tail cone. Crop-dusting companies favored the Stearman biplane, the famous "Yellow Peril" of preliminary flight training in both the Navy and the Air Force.

In all, the WAA sold at least 31,000 planes approved for flight. Many more than that were grounded, either for safety or from just plain lack of usefulness. Combat-plane fuel consumption alone was enough to scare off most buyers. A single-engine Mustang got 3.5 miles to the gallon. Flying a fighter or bomber, one WAA official said, was "just like dipping up gasoline and throwing it out of the window." The government cut prices to the bone and beyond to find a home for as many nonflying models as possible. Educational organizations of all types—even prison schools and Boy Scout troops—could buy grounded aircraft at fractions of pennies on the dollar. A B-29 Superfortress cost $509,465 to build in 1945; how about a used one for $350? Or a P-38 Lightning, its price then down to $150? By mid-1946 schools had bought nearly a thousand planes off the Army's bargain rack, chiefly for training mechanics. The government gave away hundreds more to cities and veterans' posts for war memorials. Don Lopez, now a senior advisor to the director of the Smithsonian's National Air and Space Museum, remembers that dozens of historic warplanes accumulated in a former Douglas Aircraft factory in Chicago. One was the *Enola Gay*.

Finally the Army Air Force was left with only 30,000 World War II planes to sell for scrap. Sales proceeded, not by a few hundred planes at a time, and not even by whole airfields at a time, but by *groups* of airfields. The largest sale involved 21,800 tactical planes, at five airfields, sold for scrap—for a return of two-tenths of a cent on the purchase dollar. Some of them included the original Norden bombsight, one of the top-security secrets of World War II. Salvors in Virginia and Arizona used giant guillotine-like blades to slice planes into pieces small enough for aluminum smelters. Wanting to save time, the troops at the Landsberg Army Air Ammunition Depot blew up B-26 bombers into manageable chunks using surplus TNT. Warren Dean's salvage company cut up and fed several Douglas DC-3 transports into its portable smelter, producing shiny 900-pound ingots. "Years later I heard these planes were bringing a quarter-million dollars each," Dean says. "It was one of those times where somebody has to hold your hand to keep you from slitting your wrists."

In the end, the victory over aircraft surplus was so thorough that in 1950, during the Korean War, the government had to go back to its buyers, checkbook in hand. Paul Poberezny, then a first lieutenant in the Air

Force, remembers scouting surplus shops in Wisconsin to buy back thousands of throat mikes and "Mae Wests"—life-vests. The Air Force had plenty of heavy bombers for Korean airstrikes—1,500 having been shrouded in plastic on the Arizona desert—but was short on replacement parts. So it turned to Bernard Bachman of Rochester, New York, who had stockpiled $100 million worth of B-29 supplies. And the U.S. Army even had to buy some of its vehicles back from the Germans, at the cost of some embarrassment.

Large vessels have individual fame and individual fates. The Navy resorted to atomic bombs to sink the surplus battleship *Arkansas* and carrier *Saratoga*, along with other ships, as part of a series of 1946 radiation tests; Argentina bought the cruiser *Phoenix* out of the surplus fleet in 1951 and recommissioned her the *General Belgrano*. The British Navy torpedoed and sank her during the Falklands War.

Some ships and planes are still at work. Hundreds of Liberty ships, too slow for competitive trade routes, were nevertheless dispersed throughout the world. Says Capt. Jim Nolan, a marine consultant and restoration specialist, "We sold them at a very nominal rate, practically providing a subsidized fleet to developing countries."

Hundreds of C-47 transports are still about, mostly in airport back lots around the world. But if you ever see a C-47 fuselage tooling down the highway on trailer wheels behind a truck, with a set of wings following close behind, there's a good chance the plane is on its way to a second career at Basler Turbo Conversions of Oshkosh, Wisconsin. Basler has carved a good business out of buying up well-preserved models, lengthening the fuselage, strengthening the airframe and mounting high-efficiency turboprop engines. The firm has converted twenty-five C-47s in the past five years and has orders for many more. According to president Warren Basler, the six-month-long process transforms the old plane into a modern transport suited for rough duty anywhere around the world. "It makes a fantastic combination," he says. "The airframe is virtually indestructible, and the engine is so reliable and vibration-free. This airplane will see its 100th birthday for sure."

Things went swimmingly in civilian life for the DUKW. The amphibious truck, sold to the Christian Fellowship of Trenton, New Jersey, spent years faithfully ferrying groups of schoolchildren across the Delaware River.

Itchiku Kubota's fascination with an ancient textile art

The Japanese master has devoted his life to reviving a long-lost technique of fabric design and to creating handcrafted kimonos of lyrical and lasting beauty

If Japanese artist Itchiku Kubota has his way, he will live to be 120. That's how long the 78-year-old textile master estimates it will take him to complete his life's work—a series of 75 elaborately handcrafted kimonos, which, when hung side by side, will form a panoramic tapestry celebrating the four seasons and the cosmos. Kubota, a renowned craftsman and painter, considers this series, entitled "Symphony of Light," to be his masterpiece.

Thirty of the finished works, tracing the transition from autumn to winter, are currently on display at the National Museum of Natural History. "Landscape Kimonos by Itchiku Kubota" also features 15 other kimonos inspired by motifs, such as a burning sun (detail, opposite), that reflect the artist's reverence for nature. The exhibit, on view through April 14, 1996, was made possible by the Nippon Foundation (formerly the Sasakawa Foundation).

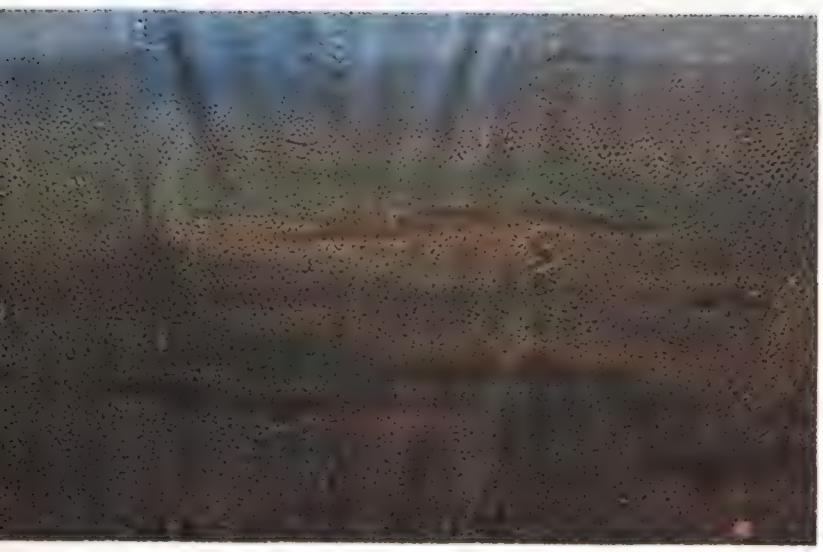
Born in Toyko in 1917, Kubota began studying *yuzen* (rice-paste resist) dyeing at age 14. Six years later, he stumbled upon a fragment of elegantly patterned cloth in the Tokyo National Museum. "Trembling in the face of such mastery and refinement of beauty," he relates, he stood transfixed for three hours. "In a sudden moment, I encounterd a source of boundless creativity which revealed to me my calling."

More than 350 years old, the remnant was a rare example of the lost art of *tsujigahana,* a complex method of tie-dyeing embellished with intricate embroidery, elaborate brush painting, *sumi* ink drawing and gold-leaf application. The technique, often referred to as "illusionary dyeing," flourished in Japan during the 14th to 16th centuries.

Over the years, Kubota's fascination with *tsujigahana* grew. After his release in 1951 from a Siberian prisoner-of-war camp, he decided to devote himself to creating a modified version of the lost art—a goal that consumed 20 years. He has since won international acclaim for his unconventional designs, distinctive use of color and unwavering dedication to an extraordinarily laborious craft.

The juxtaposed kimonos of the "Symphony of Light" series (below) compose a continuous mountain landscape that pans poetically through the purple shades of evening, the mauve starkness of a sudden snow and the golden shafts of autumn's last light. "I cannot die in peace until I have finished the series to which I have devoted my life," insists Kubota. "While envisioning a panorama of 75 works, I am but a traveler wandering on a path in search of more depth to my dye-colors."

Diane M. Bolz



Itchiku Kubota finds his inspiration in nature—in wind, sound, light and flowers, in capturing fleeting moments and fragile nuances of color. Characteristic puckers, made by the repeated tying of the silk with thread, create texture and depth in a detail of *Ohn (Mount Fuji)/ Tender, Cool Dawn* (top left). *Sumi* ink outlines flowers in a patchwork-like segment of *Aihatoba/ Autumn Peninsulas* (top right), and delicate traces of ferns are elegantly delineated in details from *Shijima/ Silence* (right) and *Hito/ Woman-Ferns* (far right). "In the mountains covered with russet-colored leaves that shimmer in the scarlet light, in the long line of the setting sun, and in the changing mass of the clouds, we sense the end of autumn and the arrival of winter with its stillness, desolation, and pervasive snow," says Kubota of his "Symphony of Light" series (below).

The creation of each kimono is a meticulous process that can require up to a year to complete. The intense hues of *Gaudi/Barcelona Nostalgia* (left) result from repeated applications of dyes. The fabric must be tied, dyed, steamed, rinsed and stretched again and again, sometimes more than 100 times. Kubota employs modern commercial dyes in his own "contemporized" adaptation of the lost *tsujigahana* method. As many as 300 colors may be used to realize the richness and luminosity of his intricate pictorial patterns. Rays of light and energy emanate from the sunflower, lending movement and dynamism to the design. Detail of the sunflower (above) reveals *sumi* ink drawings of works by architect Antonio Gaudi. "When you see my art and feel the movement—really feel the leaves blowing—at that moment I am there talking to you," says Kubota.

"Please, I'll never ask for anything again, let me make it to the top of this hill."

"What's that burning smell?"

"Please, I'll never ask for anything again, let me stop at the bottom of this hill."

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By Richard Wolkomir

Without garlic, life would be just plain tasteless

Sliced or chopped, sautéed or roasted, this bold little bulb has Americans clamoring for cloves to add sizzle to supper—or to cure what ails us

At San Francisco's Stinking Rose eatery in North Beach, patrons line up for dinner, drawn by a garlicky menu featuring everything from Forty-Clove Chicken and savory ice cream to roasted bulbs (opposite).

By 5:30 P.M. on Saturday the conga line already snakes up San Francisco's Columbus Avenue: thirtysomethings and Generation Xers queuing under a lurid neon sign. "The Stinking Rose," it proclaims, "A Garlic Restaurant." "How about Forty-Clove Chicken?" asks one baggy-trousered patron-to-be, a thin gold ring in one ear, studying a menu posted outside. "I'm thinking, like, neon ravioli? Like, filled with roasted garlic?" says his date, her moussed-back blonde hair streaked blue.

Something—a certain savor—is in the air. It is evening in the North Beach neighborhood, where lampposts are green, white and red, like Italy's flag, and the young and hip are lined up to get into an eatery that brags it's "chic to reek" and "we season our garlic with food."

"Garlic ice cream?" inquires a menu peruser wearing spike heels and black leggings sprinkled with glitter. "I don't know . . . yuck!" A wiser, more experienced person, shimmery in a white silk jacket: "Oh no—the garlic ice cream is really good!"

America, land of peanut butter and jelly containing high-fructose corn sweetener. Of burgers slathered with mayonnaise, pickles and ketchup. Franks-and-beans land. Macaroni-and-cheese land. Home of bologna on white bread. The United States of cornflakes and tuna-noodle casseroles and Jell-O has gone gaga over garlic!

"Tony Bennett was in one night, and Francis Ford

Photographs by Chad Slattery

Don Christopher is the country's premier fresh garlic producer: even his trucks sport garlic-boosting murals.

Coppola, and David Caruso, Ted Danson . . ." boasts Dante Serafini, one of the Stinking Rose's founders, holding court inside at a table. He looks as if he blew in from L.L. Bean country, wearing a plaid shirt and hiking boots, but he is just off a jet from Los Angeles. "We've opened a branch in L.A., and now we're planning one in New York, and then Las Vegas and Singapore," he says. "We've had requests from all over, like Toronto, but we can't go everywhere—and I don't know how Middle America relates to garlic."

Somebody out there relates to it. Between 1975 and 1994, the last year for which the Agriculture Department has records, annual U.S. garlic production more than tripled, zooming from 140 million pounds to 493 million pounds. But even that does not satisfy us. We put away another 97.3 million pounds imported from such countries as China, Mexico, Argentina, Chile, Taiwan and Spain. Per capita U.S. garlic consumption jumped from 0.6 pounds in 1975 to 1.6 pounds in 1994. And growers say U.S. production is rising about 10 percent a year.

Lots of Americans became garlic junkies in the 1980s when gourmet mania swept yuppiedom. Garlic also has crept into many of our prepared foods incognito, as a flavoring. And another reason for rising garlic consumption, in a country that once scorned *Allium sativum,* is the proliferation of garlic-intensive ethnic restaurants, such as Thai and Korean. And, as garlic impresario Serafini puts it, "there's the health thing."

European folklore has long touted garlic as a remedy, and not just for vampires. Nicholas Culpeper, in the 1652 *Complete Herbal,* averred that garlic heals the bites of mad dogs and venomous creatures. It also rids children of worms and "cutteth and voideth tough phlegm, purgeth the head, helpeth the lethargy." It cures plagues, sores and ulcers, too. And Culpeper promised garlic will clear up skin spots and blemishes, earaches and abscesses. Now medical researchers are finding that garlic may really be the cure for just about anything that ails you, except halitosis.

"Studies show that garlic is promising for reducing blood pressure and high cholesterol, it seems to help with common colds, it can enhance the immune system, and it is a possible cancer preventative," notes clinical nutritionist Barbara Levine of the New York Hospital-Cornell University Medical Center in Manhattan. In January 1995 the nutrition information unit she heads set up a Garlic Information Center because of rising interest among both the public and researchers. "Our Garlic Hotline," she says, "can get as many as 1,200 calls a day!"

She cautions people not to shun traditional medical care, however, in hopes of self-curing all illnesses with garlic. But she adds that about 3,000 studies of garlic have been completed. Rats have been getting garlic in their rat chow, and human volunteers have been getting

Once a crop of garlic is harvested from the 3,500-acre Christopher Ranch, outside Gilroy, California, the bulbs are crated and transported to the company's nearby factory complex for sorting, peeling and processing.

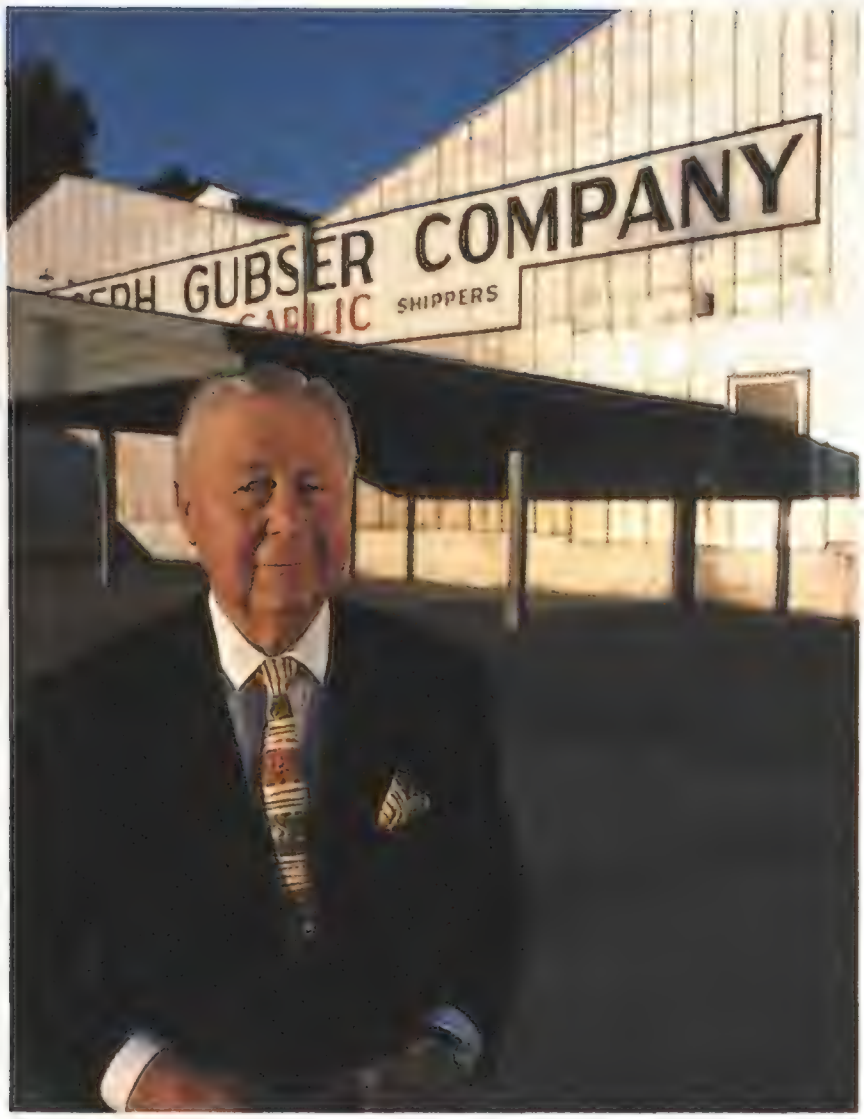
it in their human chow. "It's very promising," Levine continues. Many Americans now eat raw garlic, but she warns that uncooked garlic can upset stomachs. And she says cooking may alter garlic's organic sulfur compounds in good ways, making them even more beneficial. Aged-garlic extracts used in diet-supplement capsules may also have benefits, the studies suggest. Meanwhile, the Garlic Hotline keeps ringing.

Admittedly, naysayers do exist. Queen Elizabeth has pronounced garlic unpleasant to the royal palate. The Stinking Rose shot back with a searing press release: henceforth, it proclaimed, Her Majesty is banned from the premises. "Yes, she is still banned," admits Serafini, looking embarrassed. The banning was a bright idea of his restaurant's publicist. Serafini himself clearly would prefer to invite the queen over, on the house, to show her what garlic can do. She might try, say, the Italian Garlic Meat Loaf with Garlic Mashed Potatoes. "That's one of our most popular specials—we got the meatloaf recipe from an African-American family, and we Italianized it with ground vegetables that cook inside," he explains. Or Her Majesty might go for the Pesce al Fuoco, which is swordfish in a spicy garlic tomato sauce with polenta. After a visit here, Her Majesty just might drop that tired blue-blooded garlic phobia of hers.

According to *The Book of Garlic* by Lloyd J. Harris, upper-class sneering at garlic—presumably because it makes you smell bad—goes back to the Egyptians, where the working Joes and Janes ate lots of garlic, which upper-caste priests haughtily eschewed. In ancient Greece and Rome, too, the upper classes turned up their noses at garlic. In Britain, and later in Colonial America, almost everybody shunned the earthy herb. Harris cites a letter the poet Percy Shelley wrote from Italy to a friend: "What do you think? Young women of rank eat—you will never guess what—garlick!"

Garlic has long given Mediterranean countries some of their cultural flavor. Serafini points out that "stinking rose" was garlic's folk name in ancient Rome, where legionnaires habitually rubbed their bodies with garlic to ward off colds. But our own word "garlic" actually is derived from two Old English words, *gar* (spear) and

Richard Wolkomir reports that, since writing this article and substantially upping his garlic intake, he has not been pestered by vampires—or anyone else.



Garlic broker Joseph Gubser, based in Gilroy, has traveled the world tracking the commodity's supply.

leac (leek), meaning a leek with spear-shaped leaves.

Some chefs merely rub a knife with garlic before slicing a roast. But at the Stinking Rose you can pick up bottles of more-powerful manifestations, such as garlic salsa or garlic-jalapeño mustard or the particularly stinky garlic relish, which Serafini explains is concocted for regular customers who "mainline," like San Francisco attorney Melvin Belli, known as the King of Torts. "He complained that the restaurant relish didn't have enough garlic," muses Serafini, admiringly. "So we made that relish to make your eyes go around!" After a bout with the relish, you might want to down some of the yeast tablets that supposedly prevent garlic halitosis.

It is true that garlic smells. "The woman running the kitchen when we first opened had kids peeling garlic all day long—they'd wash, but the smell would never leave," recalls Serafini. We Americans may be garlic neophytes, but we know there is no problem that cannot be fixed with a machine. "It turned out we could get already-peeled garlic from the Christopher Ranch—they peel it in wind tunnels!" Serafini says.

If you drive an hour south from San Francisco to visit the Christopher Ranch, the country's largest producer of fresh garlic, you find yourself in a complex of warehouses and factory buildings that could be turning out ball bearings or airliner bulkheads. But this is the hub of a 3,500-acre garlic empire. "I came from a prune ranch," says founder Don Christopher. "I really hated growing prunes."

Prunes were predictable, he says. With garlic, you never know. Too little rain or irrigation when the garlic is growing can invite disaster. Too much rain when the garlic is mature also can ruin the crop. That keeps a grower on the existential edge. In his office a painting shows the tall, white-haired Christopher in mid-field, triumphantly grasping a just-unearthed garlic plant in each hand.

In 1956, however, after he left his family's successful prune ranch at age 22 to grow garlic on ten acres, he was not yet exulting. First, record rains drowned his fields. After that, he eked out a living selling his bulbs to a local distributor. Finally he realized that, to succeed, he would have to pack and distribute his garlic himself. He set up packing operations under an oak tree, but even in the shade California's heat was so searing workers would faint. He loaded the crates of garlic onto his truck and drove them to San Francisco and Oakland. But back then, Americans were still mostly garlic-phobes, and the local markets could not absorb enough of his bulbs. He decided he had to market nationally.

Eventually, a New York broker took him on, and for 15 years he limped along. Americans were still ingesting too few bulbs. To fix that, Christopher helped organize a producers' group, the Fresh Garlic Association. An-

Gilroy's Garlic World emporium offers a cornucopia of wares: salsa and salad dressing to pungent braids.

On Monterey Street in Gilroy, garlic capital of the world, a jaunty mural touts the town's claim to fame.

other idea was a 1979 garlic festival in Gilroy, a center for the garlic industry in California, the state that produces 90 percent of the country's commercial garlic. The festival dumbfounded its organizers by attracting 15,000 visitors, including newspaper food editors. Garlic recipes popped into print. By 1995 attendance had risen to 90,000, an annual gastronomical Woodstock.

Late one morning at the ranch, under a laser-bright sun, the air is redolent of garlic, the olfactory ghost of past harvests. Don Christopher leads guests into the gloom of building after building, explaining the peculiarities of big-time garlic processing. Of the more than 300 garlic varieties grown worldwide, the ranch produces six, he says: California late, California early, Lerg, French, elephant and Oriental. "Garlic takes a lot out of the ground, so you don't grow garlic back-to-back, year after year, and we've added other crops, like bell peppers, for rotation," he says. "I can make profits if I do it right, and go broke if I do it wrong—it's like gold fever!"

Except, this gold you plant—in October and November. Some bulbs saved from the recent harvest, or grown especially for sowing, go through a "cracking" machine that separates them into cloves. After disking and plowing the soil, garlic growers machine-plant the cloves in long beds. Within a few weeks green spears shoot up. The farmers fertilize the growing garlic plants and irrigate. By May some varieties have already matured. At this stage, water is a killer: farmers stop irrigating and pray for drought.

When the tops look dry, the farmers "knife" the crop, running a tractor-drawn blade through the ground beneath the subterranean bulbs. After that, crews hand-pull the garlic plants, shaking away the dirt from their cut-off roots. Next, they windrow the plants, drying them in the sun for about two weeks, each plant laid so that its leafy top shades the next plant's bulb from sunburn. Workers then move along the windrows, clipping off the roots and tops (which get plowed into the soil) and tossing the bulbs into bins to be hauled to a processing plant, like the one at Christopher Ranch.

Inside the first building Don Christopher enters, garlic bulbs are moving down a conveyor belt. Along one stretch, workers pluck bulbs that look bruised. The surviving bulbs move on to a machine that sorts by size. Christopher plucks a bulb from the reject bin and eyes it like a prospector evaluating a just-dug-up sapphire. "There's nothing wrong with these—it's just esthetics," he declares. "This will go for peeled cloves."

He leads the way to the peeled-clove building, where garlic cloves roll in on automated hoppers. They ride up one story, then tumble into a vibrator. "Inside, a shot of air hits at just the right pressure and blows the peels right off," Christopher explains. An optical scanner picks out bruised cloves. The rest go through a chiller

Garlic's protective powers—including warding off vampires—have long figured in legend and drama.

(peeled garlic keeps better if it is refrigerated). Then the cloves go into jars for shipment.

"We used to peel the cloves with rollers, but a guy out in El Centro, cleaning a shed with an air gun, discovered that after he hit a batch of garlic with the air blast, all the peels were gone," says Christopher, who likes air-blast peeling so much he built a peeling plant in France. "Europe has twice our per capita garlic consumption, and we hoped to take Europe by storm. But we're not doing well over there—they just won't change," he says, exasperated. The Europeans, it seems, prefer to buy whole garlic bulbs and peel by hand.

Some of the Christopher Ranch's 450 employees operate machines that pack two-bulb containers for supermarkets. Others run puree machines, converting garlic cloves into the mush that goes into such products as barbecue sauces and salad dressings. "Even with the machines, garlic is labor intensive, and it's one of the most costly volume crops," says Christopher. Still, garlic production steadily climbs. According to Christopher, producers of dehydrated garlic, bottled as flakes and powders, have boomed because they are totally mechanized and because dried garlic is an ingredient in everything from bottled spaghetti sauces to frozen pizzas.

Some farmers raise garlic organically. The herb has become an alternative crop for small farmers in such unlikely places as the Hudson River Valley, where rain at the wrong times militates against large-scale commercial growing. And in the Sangre de Cristo Mountains near Santa Fe, the award-winning novelist Stanley Crawford, who calls himself a "New Age over-educated farmer with an M.A. in the Landscape of Ideas," has chronicled his life as an organic garlic farmer on 1.5 acres.

"If you grow good garlic, people will love you for it," writes Crawford in *A Garlic Testament.* It is a shelf-life issue, he believes: too much American garlic spends too much time riding on trucks and trains, and sitting on supermarket shelves wrapped in plastic, which suffocates it. "Because the bulb does in fact need to breathe," says Crawford. And yet, he points out, without us garlic is doomed. Most garlic grown today is nonbolting, which means it has been cultivated so long it needs us to dig up its bulbs, break them into cloves and replant. Without us, the bulbs would remain in the ground, and the sprouting cloves, clustered together, would strangle one another.

Garlic is life's organizer for Crawford and his wife, their year regulated by the cycles of planting and tending communal irrigation ditches with neighbors, harvesting with friends and children, and peddling their bulbs in the local markets. But most growers get their bulbs to market via brokers, who buy here and sell there, tracking international garlic supply and demand. And that work has its own romance.

At the south end of Gilroy is an aluminum-sided warehouse with a sun-bleached sign: "Joseph Gubser Company, Garlic Growers and Shippers." The lot beside the Gubser building is stacked six-high with wooden garlic bins ready to be forklifted onto trucks. Everything here looks old, and it is. "My grandfather was a Swiss dairy farmer who came over to Gilroy, and my father was one of the first garlic growers in California," says Joseph Gubser jr., who is white-haired and courtly.

A lifetime of garlicky memories

It is hushed inside the Gubser building at this time of year, except for the occasional ringing of the telephones in the next room, where Gubser's longtime secretaries take calls from Mexico or France. He is sitting behind his broad desk surrounded by mementos of a lifetime of moving garlic bulbs around the globe, responding to growing seasons in different latitudes and to excess rain on one continent, drought on another.

"In 1943, when I was only 20, I already was dabbling in business," Gubser recalls. "That year the Basic Vegetable Products Company, in Vacaville, got a big order from the government for dehydrated garlic. But the war was on, and the government had put all the Japanese, who in those days grew most of the garlic, in internment camps. So Basic asked my father if he could find 20 truckloads of garlic in warehouses." Gubser's father said no, embarrassed that he might seem to be profiting

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from his Japanese-American neighbors' misfortunes or from the war. "But you should talk to my son," he said.

The younger Gubser took on the deal, although the company would pay only 2.75 cents per pound. "I found an old friend of my father's who had a lot stockpiled that he was planning to dump, and I said I'd pay 0.75 cents per pound—so I made enough money to set myself up in the packing and selling business," says Gubser.

A New York company called at the height of World War II, ordering some garlic. Gubser made sure all the bulbs they received were perfect. "They called me to come to New York and talk about doing bigger business," he remembers. He became friends with an old-time New York garlic dealer, who regarded the gentlemanly young go-getter as a reincarnation of himself as a youth. "By 1948 we were partners in bringing the first garlic in from Europe after the war—I was bird-dogging over there." That meant riding railroad trains through the bombed-out farmlands of Europe, hunting for good garlic crops and buying them for export to the United States. "I remember," says Gubser, "buying bread and salami and bringing it to the docks at night for the guys loading the garlic onto the boat in Genoa."

In one particularly busy year of buying and selling garlic, Gubser visited 38 countries. He would follow the garlic seasons around the globe, buying in the Southern Hemisphere to sell in the North, then reversing with the seasons, buying Northern garlic to sell in the South.

America has come a long way down the garlic road since Gubser started out. Now the roadside garlic markets near his offices offer garlic salsa, garlic stir-fry sauce, garlic teriyaki, garlicky Greek seasoning, "Gourmet Garlic Cream" from Hungary, garlic-stuffed olives, garlic wine vinegar and garlic mustard. For dessert, there are chocolate peanut butter garlic cups. Meanwhile, gastronomically adventurous Americans can aromatize their kitchens into New World outposts of Bangkok or Seoul or Aix. They are learning to slice the cloves large for mildness or for long-cooking dishes, and to chop them into bits for pungency or for fast cooking. They are learning to roast whole garlic bulbs in little clay pots and spread them on French bread.

Garlic, perhaps alone among the herbs, has even starred in a movie, *Garlic Is As Good As Ten Mothers*, a funky 1980 documentary by Les Blank and produced by Flower Films, featuring venues in and around San Francisco: restaurants, garlic festivals, homes. The camera peers over the shoulders of chefs—Italian, Cajun, Chinese, Spanish, French, Mexican—as they slice and mash garlic to prepare such repasts as Yucatán Fish, served with a whole garlic bulb in the fish's mouth. "Garlic is the Italian marijuana!" proclaims one enthusiastic chef. The screen shows us a bumper sticker: "Fight mouthwash—eat garlic." It also flashes us the movie's theme: "Life without garlic is tasteless." That is Joe Gubser's theme, too. But he means it in a larger sense.

Downtown, a few blocks from his office, he stops to study a mural painted on the side of a building. It shows workers in fields dumping basketfuls of bulbs into bins. Each bin bears a garlic grower's name. The names are Italian, Filipino, Anglo. Many names are Japanese, the parents of Gubser's childhood friends, sent to internment camps during World War II. Many lost their farms. "They were as American as any of us," observes Gubser.

On his office wall hangs a letter he once received from garlic growers whom he helped form a cooperative in Rincón de Romos, Mexico. For years he has marketed their garlic, and he displays the letter the way someone else might show off a Nobel Prize. "Very Respectable Friend," the letter begins, "The purpose of writing these lines to you is to show our thankfulness towards the Gubser Family for everything that you have done for the benefit of our Association, and in fact even for our families. . . ." Gubser looks thoughtful. "There are a lot of things to be taken into consideration when you're talking garlic," he says.

Per capita garlic consumption in America is up to 1.6 pounds annually; one family could consume this harvest.

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By Henry Adams

Rembrandt or not Rembrandt?

His style was widely imitated, even in his own time; now, a show at the Met guides us through the maze of attribution problems

Rembrandt. It is the name of a brand of toothpaste and also, in the plural, of a popular rock'n'roll band. In common parlance it has come to signify something creative and amazing. Originally, and at the root of these other things, stands the first name of a painter, Rembrandt van Rijn—"Rembrandt of the Rhine River"—whose father's windmill stood in Leiden, near a northern branch of the Rhine in the Netherlands.

The ninth child and youngest son in a family with ten children, Rembrandt was born in Leiden in 1606 and died in a small house on the outskirts of Amsterdam in 1669. At age 17 he studied briefly with the history painter Pieter Lastman but soon set off on his own course, creating an innovative and memorable style that was much imitated, beginning with the works of his own students. The result of that imitation is that a large number of paintings that have come down to us may or may not have been painted by Rembrandt. Such a situation creates what scholars call an attribution problem.

Confronting this dilemma head-on, the Metropolitan Museum of Art in New York City has organized an unusual exhibition entitled "Rembrandt/Not Rembrandt," which will be on view through January 7, 1996. Included in the show are 55 paintings in the Met's collection by Rembrandt, his pupils and other 17th-century followers, along with x-radiographs (more commonly called x-rays), autoradiographs and other technical evidence that aids curators in their efforts to learn all they can about the paintings in question.

The show offers a fascinating look at the often-hidden world of museum work. It is also an interesting way of learning more about Rembrandt, whose name, after all, has become almost a synonym for "genius." As early as 1630, when Rembrandt was a beardless youth in his early 20s, Constantijn Huygens, the secretary of the Prince of Orange, declared that he was "struck dumb" by the young man's ability to capture emotion and expression. In this respect, Huygens declared, Rembrandt had already surpassed all the great painters of the past.

Emotion and expression: from the beginning they were at the heart of Rembrandt's work as a painter, and he developed a new artistic language to communicate them. His most obvious visual trick was the strong contrast of light and dark, a device he borrowed from the Italian painter Caravaggio. But whereas Caravaggio used light and dark in a theatrical way, as a dramatic device, Rembrandt saw its potential for introspection. His paintings, or at least the most successful of them, seem

All images: Metropolitan Museum of Art

X-radiography (opposite) and autoradiography (above) images allow specialists to "see under the surface" of Rembrandt's 1660 *Self Portrait* (right) for a better understanding of the artist's working method.

Man in Oriental Costume is accepted by scholars as a work by Rembrandt—not because it is documented, but because of its exceptional quality. It sets a standard by which works in question can be judged.

to peer into the inner soul of his subjects. Caravaggio's transition between light and dark tends to be sharply defined; Rembrandt, on the other hand, created middle tones that melt into the shadows, a transition both gentle and curiously ambiguous: the lights seem somber, and yet the deepest shadows are miraculously luminous and suffused with color.

Along with this handling of light, Rembrandt had an uncommon grasp of the nuances of facial expression. Not much interested in classical standards of beauty, he liked faces that were wrinkled and careworn and that expressed some sort of spiritual illumination achieved through suffering.

Popular myth often presents Rembrandt as a social outcast, spurned by the stout burghers of Amsterdam. The truth is more complex, for while Rembrandt's career went through dramatic swings, he remained a celebrity—albeit a controversial one—up to the end of his career. Enormously ambitious—in fact, something of a social climber—Rembrandt moved from Leiden to Amsterdam in 1631 and rapidly became the most successful portrait painter in the city. Wealthy burghers flocked to have him limn their likenesses, and two years later he married Saskia van Uylenburgh, the cousin of a prosperous art dealer. By the end of that decade, Rembrandt had bought a large house and was making extravagant art purchases.

But this period of happiness with his new bride did not last long. In 1642 Saskia died, and shortly afterward, apparently due to years of reckless spending, Rembrandt fell into financial difficulties. In 1657 his house and art collection were sold.

A string of personal scandals

At about that same time he became involved in personal scandals. A few months after his wife died, he had an affair with his son's nurse that ended acrimoniously, leading to several lawsuits. Not long afterward, to the shock of friends and patrons, Rembrandt began openly living out of wedlock with a servant named Hendrickje Stoffels; he avoided marriage to her since, because of a clause in Saskia's will, it could have led him to lose his late wife's inheritance.

During his final years, Rembrandt lived modestly, protecting himself from creditors and lawsuits through inventive legal maneuvers. In 1660 he and Hendrickje moved to a small house at the edge of Amsterdam. Three years later, Hendrickje died, only 37 years old, and Rembrandt himself followed six years afterward. Despite, or perhaps because of, his personal hardships, in his late years Rembrandt's style of painting became increasingly broad in execution and emotional in feeling. While many former patrons avoided him, he nonetheless continued to attract wealthy clients, such as the

Based partly on resemblances to *Aristotle with a Bust of Homer*, *Flora* is accepted as a Rembrandt, c. 1654.

munitions manufacturer Jacob Trip, one of the richest men in Europe, who had Rembrandt paint his portrait around 1661; or the officials of the Clothmakers' Guild, who commissioned a group portrait in 1662.

Words like "miraculous" and "spiritual" have been applied to Rembrandt's work, and his fame encouraged widespread imitation; the result is that, for centuries, his work has been confused with that of other artists. The noted French art critic Eugène Fromentin was moved almost to tears by Rembrandt's painting *The Good Samaritan* in the Louvre—which scholars now generally ascribe to a follower, probably Constantijn van Renesse. In the 19th century a portrait attributed to Rembrandt, *Elizabeth Bas*, was so popular that it was used as the emblem for a brand of cigars; scholars now generally ascribe it to Ferdinand Bol. The 20th-century Harvard scholar Jakob Rosenberg closed his monograph on Rembrandt with a drawing that he attributed to the master; scholars now concur that it was from the hand of Abraham Furnerius.

Such cases might be multiplied by the dozens and are perhaps best expressed with simple numbers, which suggest the expansion and contraction of Rembrandt's oeuvre. John Smith, who during the 1830s made the first attempt to catalog Rembrandt's work, listed just over 200 paintings, but between 1897 and 1935 this number expanded rapidly, as new works were discovered in an atmosphere of heady enthusiasm. Wilhelm von Bode's eight-volume corpus counted 377 Rembrandt works, Adolf Rosenberg's catalog put the total at 558 and that of Wilhelm Valentiner, 606. Moreover,

Experts debate whether *Portrait of a Woman* is one of Rembrandt's lesser works or is by another artist.

within a decade of publishing his compendium, Valentiner had uncovered an additional 99 paintings. Abraham Bredius' catalog of 1935, which was long considered a standard work, listed 630 Rembrandts.

In the 1960s the tide turned and a process of reduction began. At present a group of Dutch scholars, the Rembrandt Research Project, is compiling a catalog of Rembrandt's works that is expected to reduce the number to about 280.

Why the confusion? First, only a few dozen of Rembrandt's paintings can be securely traced back to the 17th century, with the support of original documents. Moreover, those paintings that are known to be Rembrandts are often atypical because of their large size or unusual subject. Also, many paintings carry Rembrandt's signature, but the signature may have been added at a later date. Then there's the fact that several authentic Rembrandts carry fake signatures; this is because the original signature was sometimes lost when a painting was trimmed and a new signature was affixed later by another hand. What all this means is that the majority of Rembrandt portraits and religious paintings must be ascribed to the master or one of his imitators on the basis of style alone.

It gets complicated. As a young man, Rembrandt was close friends with Jan Lievens, and their work was so similar that as early as 1639 a painting by Lievens in the collection of the king of England was miscatalogued as a Rembrandt. After Rembrandt moved to Amsterdam in 1631, he attracted dozens of pupils who worked beside him, emulating his technical recipes and visual effects. Even in the early 1650s, when Rembrandt was running into financial and personal difficulties, the flow of students and followers seems to have continued unabated. Indeed, curiously, it is his later works, often considered the most personal, that have caused the greatest controversy among scholars.

No American museum has been more affected by these changing directions in scholarship than the Metropolitan Museum, which, since 1871, has acquired 42 paintings attributed to Rembrandt. Today, somewhere between 16 and 21 of these are considered by scholars to be by Rembrandt; disagreement exists even among the museum's staff as to the exact number. Most museum exhibitions present an image of assurance and certainty, seeking to hide undercurrents of doubt; "Rembrandt/Not Rembrandt" is probably unique in the degree to which it openly addresses scholarly uncertainty and seeks to explain the issues to the general public.

The two curators of the show are not always in agreement, but this is not viewed as a problem. "We have dual entries in the exhibition covering the same picture," notes Met director Philippe de Montebello. "On the whole, with the exception of two or three pictures, there's not much disagreement on the bottom line. But you do have shades of meaning and interpretation. In the case of Hubert von Sonnenburg you're dealing with a combination of an art historian and a conservator. This is a man who knows the pictures intimately, lives with them, has them in his studio, has cleaned some and worked on the varnish of others. He knows them in a very tactile, almost subcutaneous relationship. Walter Liedtke also knows Rembrandt well, but as a research scholar and an art historian, he brings a more academic approach to the project. He provides a summation of what has been written about the pictures and the changing opinions about their authorship. He has mastered the complex literature on Rembrandt's pupils."

Von Sonnenburg spends a great deal of his time in the cathedral-like, skylit conservation studio of the Met, located high up in an attic space with wonderful views of Central Park. Gentle and soft-spoken, he stands straight and somewhat stiffly, like a saint on the doorjamb of a Gothic cathedral; and like a medieval statue furrowed by centuries of rain, his face is hollowed with thoughtful lines. Walter Liedtke can usually be found in his book-lined office tucked behind the mezzanine. Spectacled, lean and intense, Liedtke seems solemn until he discusses Rembrandt; then an eager enthusiasm emerges. On

The author of two books on Thomas Hart Benton, Henry Adams last wrote for SMITHSONIAN *about Thomas Cole's landscape paintings (May 1994).*

occasion, the two men look at issues differently, but on the whole what is striking is how their thoughts seem to converge on common themes despite starting from different points.

Until recently scholars believed that most Rembrandt imitations were made in later periods—perhaps in the 18th century or even the 19th, when Rembrandt had become almost a mythic figure in writings about art. But recent research has shown that this is not the case. The canvas, wood panels and pigments used in these works are usually typical of the 17th century. Indeed, not only the materials of these paintings, but the very manner of mixing the colors and building up the pigments is often nearly identical to the practices of Rembrandt.

Imitation as flattery—not forgery

"The most deceptive pictures," notes Liedtke, "were probably done by very gifted young people, either during their student years or in the first years thereafter. The confusion began very early. Pictures by Drost, Bol and others were mistaken for Rembrandts in the early 18th century." In other words, most of these deceiving works were probably not made with dishonest intention, as forgeries; many, in fact, were probably produced in Rembrandt's studio, under his guidance, by artists eager to learn his techniques.

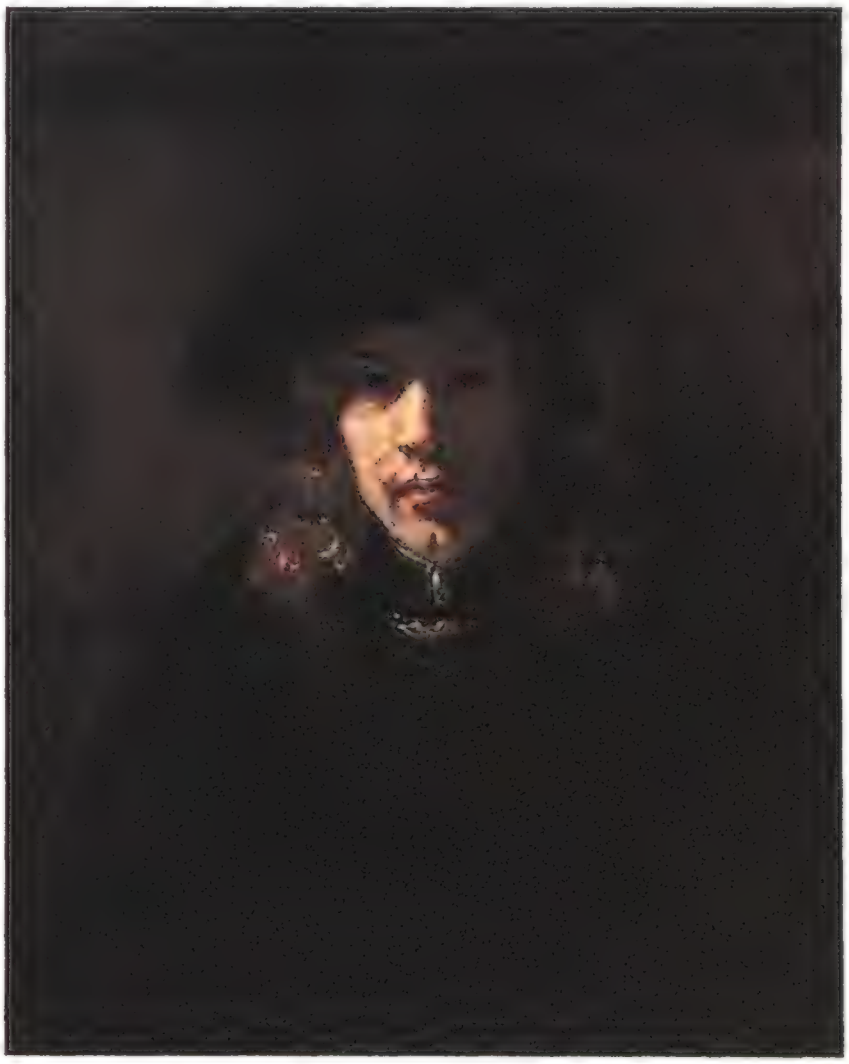
Rembrandt's workshop differed notably from the way large studios were organized in Italy and Flanders. Italian and Flemish masters organized their studios like factories and used a body of assistants to help fabricate their works. Peter Paul Rubens, for example, often depended on assistants to create his gigantic canvases; they enlarged his designs from small preliminary sketches. Sometimes he would only apply the brush himself at the end of the process, touching up the surface of the design, particularly the faces and the most expressive details.

In Holland during the 1600s, however, Dutch patrons did not support large painting programs of the sort that made such a factory-like approach work efficiently. In contrast to Rubens, Rembrandt treated his apprentices not as subordinates but as fellow artists. While they all absorbed his style, they seem for the most part to have made their paintings themselves, from start to finish, as Rembrandt did himself. Even when executing the 14-by-12-foot canvas *The Night Watch*, Rembrandt roughed out the design himself rather than use assistants.

Liedtke has been struggling with the process of matching up the large number of unattributed paintings with pupils who can be documented and who left signed or dated works. Many of these works are like familiar friends to him. "*Old Woman Cutting Her Nails* in this museum is as familiar to me as my couch at home," says Liedtke. "If I saw my couch on the subway, I'd know it was my couch. If I go to Minsk or some other faraway place, perhaps working on another project, and I see a painting that looks like *Old Woman Cutting Her Nails*, I immediately make the connection."

Von Sonnenburg and Liedtke are helped in their task by a group of sophisticated techniques—some of them a century old, others much newer—that now make it possible to peer beneath the surface of a picture, following the artist's working method step-by-step. One of the handiest of these techniques is x-radiography (commonly called x-ray photography), which was being used to examine paintings within a year of its discovery by Roentgen in 1895. Familiar to most of us through medical uses, x rays penetrate the surface of objects but are partly blocked by dense substances, such as lead or bone. In the case of paintings, they show the buildup of metallic pigments, such as lead white, in crisp images that vividly reveal the structural quality of the artist's brushwork. X-radiographs are often useful in spotting modern restorations.

Also valuable for looking at Rembrandt is a newer method called autoradiography, which creates images on film that show the distribution of specific pigments. In this technique, a painting is bombarded with low doses of radiation, then successively exposed over a pe-



Portrait of a Young Man with a Beret, by a Rembrandt follower, offers little sense of the sitter's inner life.

In an x-radiograph of *The Auctioneer*, the brushwork delineating the face is unlike Rembrandt's freer style.

riod of about a month. Since different substances release radiation at different rates, it is possible to produce a series of images revealing the distribution of such substances as manganese, copper, sodium, arsenic, phosphorus, mercury and cobalt. In lucky instances this can produce a series of eight or more autoradiographs showing how a painter built up a design from the underdrawing to the final paint layer.

For example, the fifth autoradiograph of Rembrandt's *Self Portrait* of 1660 (p. 83) reveals his initial sketch, previously invisible, which he executed rapidly and freely on the canvas with a dark pigment. In essence, we have a new work of art to study and compare with other examples, where formerly we had only one. In this case, it turns out that the newly revealed underdrawing closely relates to two self-portrait drawings, one in Rotterdam, the other in Vienna, that Rembrandt made at about the same time. Being able to see the early stage of Rembrandt's working method thus helps in the process of attribution and dating.

These radiographic techniques are supplemented by the judicious taking of tiny paint samples, which are microscopically analyzed to reveal the layering of the pigments. Such analysis is highly technical and often difficult for the general public—or even the typical scholar—to interpret and understand. For a trained conservator, however, this step is useful for fully understanding the buildup of a painting, which tends to become blurred through other imaging techniques.

So how do scholars distinguish the work of Rembrandt from that of his students? To an inexperienced eye, they are easily confused. On the one hand, Rembrandt's early work does not look typical of his work in general; to most people it looks like it was produced by a different artist. Rembrandt had not learned to paint like Rembrandt yet. On the other hand, many romantic, darkly lit paintings of the 1650s have the traits that people associate with Rembrandt's late style, but they are actually student works.

Weighing all of the evidence

The first step in deciding whether a painting is by Rembrandt is to place it within his career and compare it with a work known to be authentic. Then the real challenge begins. First, the connoisseur might consider the overall emotional impact of the painting and how it compares with known works by Rembrandt of similar date. Is the work expressive and emotionally moving? Then he might look more closely at brushwork and the way the paint is built up. Is the technique characteristic of Rembrandt?

Here, the scientific techniques often enter the picture, although they rarely provide an easy answer. There is no magical method of counting molecules, or light rays, or radioactive particles, or anything else, that definitely reveals whether a painting is by Rembrandt. For the most part, these tools simply increase the amount of visual information that scholars can look at and subjectively interpret.

In fact, expressive power remains a key test of an authentic Rembrandt. "The old 'genius' story was expressed in an exaggerated way," explains Liedtke, "but it has a bedrock of validity. Rembrandt was clearly an extraordinary person who felt deeply and expressed profoundly. Occasionally a pupil produced something equally as good as his work, but no one could do so consistently. It's a mistake to think that Rembrandt's pupils couldn't occasionally be profound, but they couldn't maintain Rembrandt's expressive quality from one picture to another."

In addition to considering the general effect, the connoisseur looks closely at the technique. Despite the freedom of his brushwork, Rembrandt always created a sense of convincing form. When he painted a sleeve, for

example, it seems to have a solid arm inside. In the work of Rembrandt's pupils, on the other hand, the sense of form becomes mushy. This contrast between master and follower is apparent when we compare Rembrandt's *Aristotle with a Bust of Homer* (p. 91) with a work of about the same date by one of his imitators, such as *Portrait of a Young Man (The Auctioneer)* (p. 90).

"*The Auctioneer* is by someone who very deftly imitated the surface of Rembrandt," says Liedtke, "but despite the initial good impression, you really don't have the same sense of form, space, atmosphere and texture. It doesn't evoke all those qualities of the physical world that you always have in Rembrandt. If you put the two works together, *The Auctioneer* simply doesn't hold up. When you look at Aristotle's sleeve, it has physical substance. When you look at the sleeve of the auctioneer you wonder where the elbow is and why the wrist pokes out so far. There's no sense of form under the sleeve."

In addition to producing poorly rendered passages, such as the misproportioned arm in *The Auctioneer*, Rembrandt's followers could not quite equal the skill with which he built up layers of paint to evoke subtle flickerings of light and shadow. For this reason, the handling of light also provides evidence of Rembrandt's authorship. Once again, the contrast between *Aristotle* and *The Auctioneer* helps to illustrate this distinction.

"When you look at Aristotle's head and face and then turn to the face of the auctioneer, it looks like a photocopy," explains Liedtke. "The scheme of light and dark is a simplification, without the complex interplay you find in Rembrandt's work. You don't have Rembrandt's gradual buildup of paint."

Reducing brushstrokes to an abstract pattern

X-radiographs are often very helpful in clarifying the technical differences between Rembrandt and his followers, since they reduce brushstrokes to an almost abstract pattern, emphasizing their rhythmic gesture. Generally speaking, Rembrandt's brushwork is more complex, more unpredictable and more varied than that of his students, as well as more ingenious in the way it captures the physical nature of forms.

"I still find x-radiographs the most useful technological tool," Von Sonnenburg notes. "For example, take *The Auctioneer*. If you look at the autoradiograph of the underdrawing, it's really not much different from Rembrandt. On the other hand, if you look at the x-radiograph, the structure of the brushwork is completely different. There are always many factors to consider, and you must pick out the one which makes the whole thing tumble over."

Although some of Rembrandt's pupils closely imitated his technical methods, none achieved his subtlety with light. "Rembrandt has an unsurpassed balance be-

The x-radiograph of Rembrandt's *Aristotle* shows a face modeled with more subtlety than the face opposite.

tween transparency and opacity," says Von Sonnenburg. "There is sufficient opacity to give whatever he paints believable volume. If you get too thin it no longer has convincing representation. This often happens in the work of his students. But Rembrandt's backgrounds are never thin in the way they very often are in a pupil's work. Rembrandt's backgrounds have a lot of color—color which is difficult to see unless you have good light. They are incredibly deep. In the face he did not simply make light and dark. He also very carefully worked over the highlights with little glowing accents—it's incredible, really."

Again and again, one finds that while the students skillfully captured the superficial look of Rembrandt's work, they failed to achieve his masterful interplay of light and shadow. For example, the kinds of differences between *Aristotle* and *The Auctioneer* are also evident when comparing Rembrandt's *Self Portrait* of 1660 with *Portrait of a Young Man with a Beret* (p. 87), by an unidentified follower. With seeming casualness, Rembrandt created a believable sense of structure in the self-portrait, while also making the skin seem transparent and luminous. The flickering highlights and shadows are exquisitely rendered, capturing every bump and wrinkle. *Portrait of a Young Man with a Beret,* on the other hand, makes a magnificent first impression, but then be-

The Auctioneer (right) was thought until recently to have been a Rembrandt work; *Aristotle with a Bust of Homer* (opposite) is known to have been painted in 1653 by Rembrandt. Scholars look at all available evidence when considering a work's attribution. In this case, the technical analyses of *The Auctioneer* lent support to those who argued that even to the naked eye it fell short of a work by Rembrandt.

gins to fall flat. We are not drawn in to the inner life of the sitter, but remain outside, promised more than we are given.

"When you're disappointed by the expressive quality of a painting that's supposedly by Rembrandt," notes Walter Liedtke, "and there's also something inadequate about the technique—when these two aspects, style and content, disappoint you, then you feel on firm ground in rejecting the work. What's most difficult is when these two factors don't match up; for example, when you find a painting of great expressive power which is disappointing in technique."

Each painting, however, presents special problems of interpretation, because each has some unusual feature. Very often, moreover, it's difficult to know if an aberrant trait indicates that a painting is not truly by the master. "Take the 1660 self-portrait," says Von Sonnenburg. "It has extraordinarily free brushwork. It's quite different from the brushwork of the other portraits, but because it's his own portrait, which he had painted many times, it *would* be different. You need to keep these factors in mind."

Rembrandt or not Rembrandt? Gradually, scholars are making progress on the problem. They still sometimes disagree, yet when the artist is as great as Rembrandt, that's somehow reassuring.

VALENTINA VILLA

By Richard Covington

The aria never ends in the opera that's Casa Verdi

Retired singers, musicians and conductors find a home in Milan, Italy, where a zest for music works like a fountain of youth

Strike an opening chord and suspend disbelief; the past is alive once more. The ghost of Giuseppe Verdi, the great 19th-century Italian composer, glides down the halls and over the tiled floors of a Venetian-style palazzo, the Casa di Riposo per Musicisti, in the noisy heart of Milan. Nicknamed "Casa Verdi," it is, as far as I know, the world's only retirement home for opera divas, conductors, composers and musical performers. The maestro inspects the harp-shaped doorknobs, the magnificent organ, the dozen pianos, the gilt reliefs of the chapel, the bookcases filled with opera scores.

Along one corridor is the telephone booth from which the indomitable tenor Salvatore Locapo, his voice still booming at 86, loved to leap out to surprise the venerable diva Sara Scuderi. "TOSCA!" he would thunder, and she, on cue, would drive an invisible knife into his back, giggling as Locapo quivered in a prolonged, dramatic, hammed death.

In the basement, baritone Giuseppe Manacchini, "the voice of 18 carats," would don his costume for *Rigoletto* at the merest hint of interest. His thin frame filled it honorably, and he would recall his glory days modestly, saying, "Frankly, there was no better Rigoletto than myself."

Overhead, the hovering ghost of Maestro Verdi recalls these scenes as the curtain rises on his final masterpiece, Casa Verdi.

Sadly, Locapo and Scuderi are gone now, but they lived their last days at Casa Verdi, built by the composer, he said, "for musicians less fortunate than I."

It's a rest home where the residents are much too busy to rest, a retirement haven where hardly anyone is retiring. The themes of great opera flourish here—love, death, passion, jealousy, betrayal, more jealousy, tragedy, tears and triumph. Verdi, composer of *Aïda, La Traviata, Il Trovatore* and *Rigoletto,* would be pleased. What is missing is the dreary state one normally associates with old age and nursing homes: depression. During my visits the residents were positively ebullient.

The musically named Eraldo Coda, a former La Scala basso, swings open the door to his room to greet me. He is an imposing gentleman with a mane of gray hair, dapper in a gray suit with a jaunty red-and-white-striped tie neatly tucked into his pants. He pulls out a picture album and recounts his recent "honeymoon" with a violinist who also lives at the Casa. The 91-year-old Coda and his companion had toured Europe by car with his newly acquired driver's license. "*Nous avons fait un peu d'amour,*" he confesses with a wink, proud of his lightly accented French. "We made a little romance."

Like all the residents, Coda seems to have drunk from some fountain of youth *de la Casa* and appears 20 years younger than his true age.

"Ah, the Moulin Rouge!" he exclaims, examining a photograph of the couple surrounded by scantily clad dancers. "*Formidable!* You know, I once sang at the Paris Chamber of Commerce. Hold on, I can tell you the

Valentina Villa, at 89, entertains guests with memorabilia from her 20-year career as a lyric soprano. At right: a statue of Giuseppe Verdi oversees Casa Verdi entrance.

Photographs by Enrico Ferorelli

exact date." From his well-organized closet, out comes a faded blue cloth-bound book that the former opera singer opens with care. "This," he says, beaming, "is the record of my 2,000 performances over three decades, beginning in 1927 and ending in 1957. Ah, there it is, the Paris Chamber of Commerce, as Osmin in Mozart's *Abduction from the Seraglio*, July 25, 1953."

Out come more albums filled with memorabilia of his career—Coda pictured with the greats: with Maria Callas (who lost and gained weight so frequently that Coda is reminded of an accordion); Ingrid Bergman, hair cropped for her role in the oratorio *Joan of Arc at the Stake*; Vittorio Emmanuele III, former king of Italy, and Queen Elena; Grace Kelly (who gave him a wallet when he sang with La Scala's chorus at her wedding).

"Life here is one big revue; one big amusement," philosophizes Emilio Cardano, whom I later join in the reading room. "It's because we were all in show business; we can't get it out of our blood." Cardano, 85, is a bantam figure, a former tenor who lays claim to being the resident Lothario. "I may not see too well, but the rest of me is perfectly functional," the old rogue quips.

Some of the residents have the physical problems that come with age, but their egos, for the most part, are hale and hearty. "There's too much suspicion, too much jealousy here," grouses Cardano. "One guest may claim a more successful career than another, when, in fact, neither of them had much of a career at all," he jokes, laughing uproariously. "Truly, this place is a paradise. In the morning, breakfast is brought to us in our room. At lunch and dinner, waiters serve us in our dining room. We live like lords. What more could we want?"

Outings to La Scala and bingo

The guests come and go as they please; except for mealtimes, there is no schedule. Casa Verdi has laundry and cleaning services; an exercise and physiotherapy room; an infirmary staffed with nurses 24 hours a day; a beauty salon. There are many planned activities, occasional concerts by visiting performers, outings to the opera at La Scala and to the Teatro Nazionale.

Each year the guests are given a stipend for a month-long summer vacation. They pass the time playing cards and bingo, practicing in the wood-paneled practice rooms, giving music lessons to students from the outside, attending religious services, gossiping, visiting each other and, inevitably, getting on one another's nerves.

"Sometimes people behave like children when they reach a certain age," admits Liana Lari, "president," or manager, of the Casa for the past 15 years and herself an indefatigable 82-year-old. "I live my life surrounded by musicians, and I've discovered, there is always a competitive edge in their relationships; they say it's to keep their musical wits sharp."

If tenor Emilio Cardano (top) is Casa Verdi's Lothario (self-proclaimed), opera basso Eraldo Coda and violinist Mercedes Romanelli may be Romeo and Juliet.

Luigi Veccia (top), a cellist at La Scala for 25 years, plays in courtyard. Pianist Fedora Baratella tapes her memories before statue of Verdi librettist Arrigo Boito.

Occasionally La Scala offers the royal box for a performance, and about 20 of the guests go to the opera. There is always a round of applause when the audience learns that residents of Casa Verdi are the guests in the box. "It makes the guests very proud," says Lari. "They're happy to see they still have an admiring public."

Even Milan's taxi drivers honor the retirees by taking them on a yearly outing to a restaurant in the countryside. Lari shows me a photograph of 20 taxis, complete with a police escort, all lined up outside the Casa.

Gifts of money, music and the occasional deer

Each March, La Scala performs a concert at Casa Verdi, a tradition begun by the legendary conductor Arturo Toscanini, one of the retirement home's first patrons. Though, in his will, Verdi bequeathed all the royalties from his 28 operas, as well as some bonds and money owed him, to the Casa's continuing operation, the royalties expired in 1962. Since that time, the home has been supported by a patchwork of investments, residents' pensions, property rentals, bequests, fund drives by an association of friends of Casa Verdi, and government grants. Over the years, other patrons, including pianist Vladimir Horowitz (the son-in-law of Toscanini), have staged benefit concerts. Composer Giacomo Puccini occasionally sent the residents a wild boar or deer he had shot. Conductor José Iturbi, tenors Luciano Pavarotti and Placido Domingo, and the Metropolitan Opera in New York are also supporters.

Inside Casa Verdi, a sprawling three-story palazzo on the Piazza Buonarroti, is a grassy courtyard lined with meticulously trimmed shrubs. At one end is a two-story chapel. When I enter, the winter sunlight is filtering through the stained-glass windows onto the purple marble interior, illuminating the mosaic angels overlooking Verdi's tomb and that of his wife, Giuseppina Strepponi. Even here, in this quiet place, the elegiac mood is broken by an aria emanating from a practice room where a student shrilly aspires to a high A.

The composer was a national hero in 19th-century Italy. He was as loved for his outspoken advocacy for Italian unification as for his music. During the last days before his death in 1901, the Milanese laid a carpet of straw on the streets near his hotel room to muffle the sound of horses' hooves. It was Verdi's "strong wish" that he and his wife be buried at the Casa.

Verdi's father was an innkeeper and modest landowner in a farming village. There is a legend that young Giuseppe would walk barefoot several miles to his music lessons, carrying his shoes in his hands to preserve them. Perhaps because of his family's constant scramble for money, Verdi developed an acute business sense and earned a reputation for driving a very hard bargain.

Later he became a generous benefactor of worthy

Former concert pianist Maria Viciani plays for three of the Casa Verdi residents practicing their singing.

causes and willed his substantial fortune to a number of charities. Verdi and his wife had no children, so besides his provision for the Casa, the bulk of his estate went to his cousins and a hospital near his home. Numerous smaller bequests went to other philanthropic interests, servants and the poor.

Throughout his career Verdi was surrounded by poor musicians, and it saddened him that those who performed his works made so little money. When they grew old, they were often destitute. Verdi resolved to create a home where they would have a dignified retirement. "At that time, musicians were employed only during the opera season," Lari explains. "There was no union, no pensions. The chorus and orchestra never made much money, so when the season was over, they had little left to get them through the year. Even lead singers, who earned considerably more, often found themselves penniless."

In 1889 Verdi quietly purchased a large parcel of land outside Porta Garibaldi. He chose his librettist Arrigo Boito's brother Camillo as the architect. The composer applied the same exacting attention to the design of the building that he brought to the writing of his music.

When Boito's construction estimate far exceeded the composer's expectations, Verdi made suggestions for cutting costs, such as reducing—from two to one—the number of windows in the double-occupancy rooms. Boito had proposed dormitory accommodations, but Verdi insisted on the more private double rooms, keeping his promise that the residents be housed as honored guests.

Though Verdi was a multimillionaire by today's standards, the project greatly strained his resources. Not wanting to start only to find he could not afford to finish, the composer wrote to his notary, requesting an accounting of his income "to the last centesimo." By the time the Casa was completed in 1900—more than ten years after its conception—the land and building were valued at a half-million lire, a sizable amount in those days. The Casa was not to open until after Verdi's death because he didn't want to attract attention.

Casa Verdi welcomed its first guests—four women and five men—on October 12, 1902. By 1906 there were 34 men and 14 women in residence. Today there are 60 guests, about evenly split. More than a thousand performers have lived in the Casa.

According to Verdi's will, the home accepts professional musicians—composers, vocal soloists, conductors, orchestral musicians, choral singers, music professors—and spouses, as well as widows and widowers. "Another criterion is that they should be alone," Lari explains. "If the applicant has no family relations or anyone to look after them, they are accepted, even if they have the financial means to live independently." If family members are available, a retiree's desire to be among musicians may be considered compelling enough for entry.

Prospective guests must be self-sufficient—both physically and mentally; Casa Verdi is not a hospital. The guests pay according to financial ability; some do not pay at all. Those with pensions pay about half their allocations to the home, amounting to some 500,000 lire (about $300) a month at most (the cost for maintaining each guest is more than three times that amount). At this time there is room for all who apply—there is no waiting list. Only Italians have been accepted so far, but Lari speculates that Casa Verdi may, in the future, be open to musicians from all the European Community.

Almost anyone—anyone who loves Mozart and Puccini—probably would be welcome, but aging rock musicians need not apply. Though there is nothing in Verdi's foundation charter that prevents rockers from living at the Casa (after all, they are musicians), they would have to get past the current guests. "Rock music is disgusting," declares the blunt-spoken Cardano. "People no longer sing, they go *rouf-rouf*," he says, barking like a dog. "The songs in my day were full of love and affection, now it's kiss me here, kiss me there. I hate it."

Give or take a few decibels of animosity, Cardano's at-

Freelance writer Richard Covington lives in Paris; his most recent article for SMITHSONIAN, *on the Edinburgh Festival, appeared in December 1994.*

titude is echoed by most of the residents. Lari was more diplomatic, allowing that rock musicians might be accepted "presumably when I'm no longer here, since I wouldn't approve." She adds, laughing, "I like melody."

Gennaro Giuliani was among the first guests admitted to the Casa in 1902, and now his grandson Vittorio, a spry 92-year-old, lives there with his wife. We sit together in the grand music salon, and Vittorio recalls how Verdi himself once complimented his grandfather. "During rehearsals for *Aïda* at La Scala, my grandfather played the ottavino flute so well," says Giuliani, relishing his tale, "that the maestro sprang up from his seat and called out, 'Toscanini, where did you find such a marvelous flutist? The sound is exactly like a bird!'"

Vittorio Giuliani's own career started in 1914, the year World War I broke out. He was a composer and conductor of popular music. His orchestra serenaded café society and promenaders in Milan before it became a fixture on Italian radio. "I still write music, you know," says Giuliani, nodding his head. "My latest composition is entitled 'Dreaming Chopin.' Would you like to hear it? I have a little arthritis, so it's not going to sound as strong as it should." Sliding onto the piano bench, he starts to play, his thick fingers gliding over the keys of the Bechstein grand, filling the cavernous salon with music.

Giuliani ends with a flourish and turns to me, beaming, clearly pleased with himself and the applause of the five or six guests seated on sofas around the piano. "I'll send you a copy when it's published," he offers. He keeps in practice by accompanying singers and performing duets with other guests.

"I'm 82 but I can still play my cello"

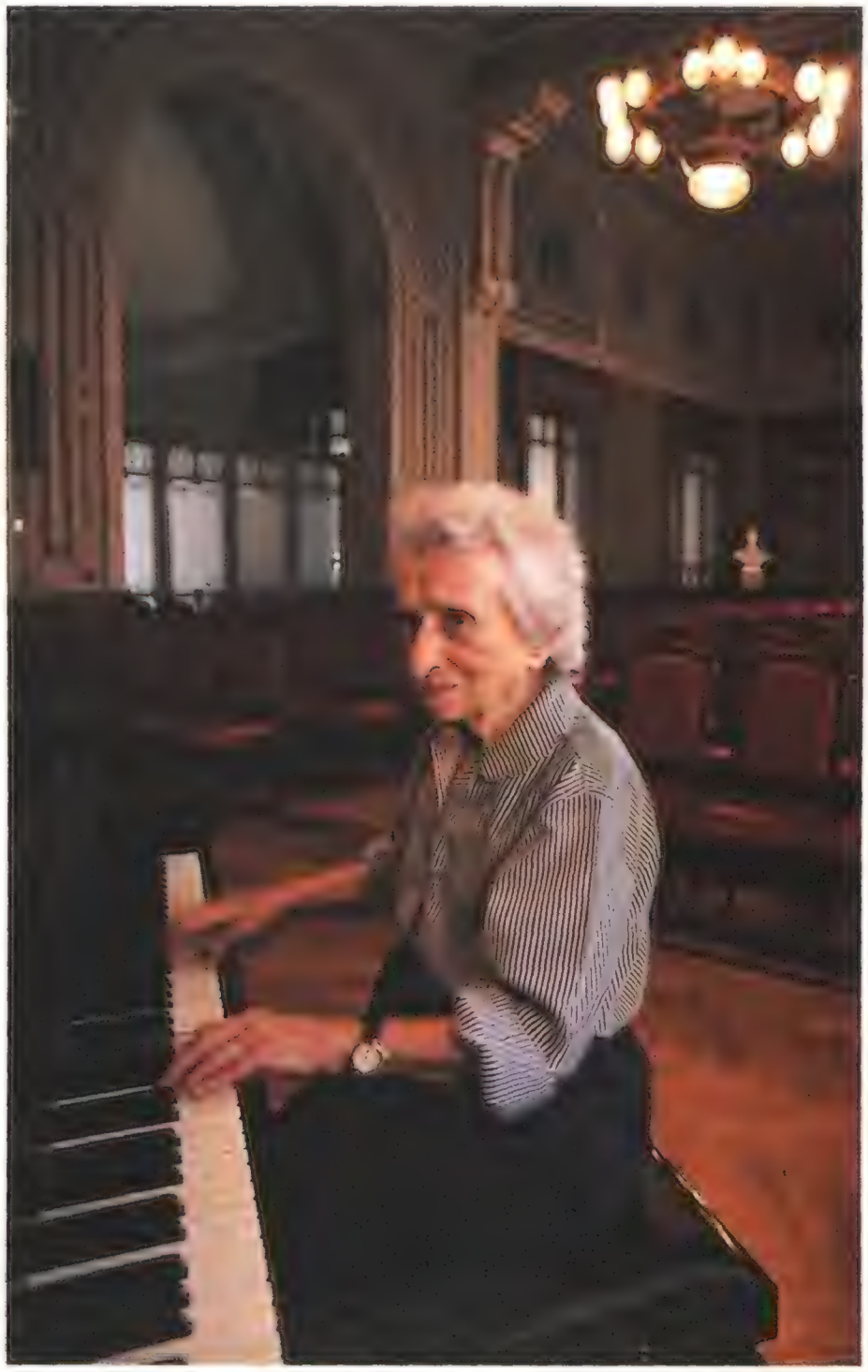
Some guests, like Luigi Veccia, a cellist with the orchestra of La Scala for 25 years, continue to give lessons. I met the sprightly Veccia in one of the practice rooms as he played a duet with a young pianist. He stopped when Signorina Lari stepped in to introduce me, and gestured to his musical partner. "This young man kindly comes to play with me once a week. I've tried to play with the other guests, but they are not so strong, you see. The piano is too demanding. I'm 82 but, thank God, I can still play my cello."

When I misidentify the piece he's playing, Veccia responds impatiently. "Mosz-kow-ski, not Mussorgsky," he corrects me, shaking his head in disapproval. Veccia is not a man to suffer fools gladly (no surprise from a musician who played under Toscanini and Bruno Walter). Suddenly he rushes out the door, calling, "Come on, come with me! I must meet another musician from La Scala who wants to move to the Casa. I'm late!"

In the waiting room, Veccia introduces me to Umberto Galli and his son Roberto, who explains why his father, age 85, wants to move to Casa Verdi. It is one of the reasons why many of the guests are drawn here. "As time passes, people like my father find themselves more and more isolated because their passion and background is the opera," says the younger Galli. "The Casa is more like a club than an old people's home, a place where they live with the people they've worked with; the people who have had the same experiences. Growing old for them becomes less of a strain if they're not isolated."

While I was speaking with Roberto, Veccia was huddling with his father. "Sorry," he apologizes. "I have a student waiting for me. *Arrivederci!*"

"The guests are very proud of being accepted to live here," says resident social worker Lucia Borrelli. She interviews prospective guests and has come to meet Signor Galli. "They are all vital people. No one sits around here waiting to die." The Gallis follow her to her office.



Though Santuzza Cervetti found it difficult to walk on her own at 98, she still played Chopin from memory.

Giuseppe Verdi (here, in an 1886 portrait) built the retirement home "for musicians less fortunate."

I follow Lari upstairs to meet yet another of the Casa's incorrigible optimists. Valentina Villa greets us at the door to her room, looking radiant. But the 89-year-old former lyric soprano apologizes that she has not had time to put on her lipstick. "I always try to look presentable," she continues. "Everyone here is very keen to keep up appearances. The fact that we're in the Verdi house means that we have to appear happier than we might actually feel because we're always on show."

Around her room are mementos of a 20-year singing career: a photograph of herself as a round-faced Musetta in *La Bohème*; another with Beniamino Gigli, the renowned successor to Caruso; another with Sara Scuderi. "La Scuderi was a great friend, a great artist. When I came to the Casa, I lived with many of the people I performed with, like Sara. One by one, these people have died, and now I'm left with no one who was part of my career. Since I've been here I've watched 140 people die," Villa says somberly. Nodding her head, she repeats the number aloud. "It's too many friends to lose." I am reminded of feisty Cardano's cavalier attitude toward death and dying. "Death! Here's what we think of death," he snorted as he made an obscene gesture. If there's any notion that these once-celebrated singers and musicians, veterans of countless operatic death scenes, would go gentle into that good night, forget about it. Did Violetta in *La Traviata*? Did Cio-Cio-San in *Madama Butterfly*? The Casa Verdi guests are larger-than-life characters, alive with personality, strong opinions and a collective brio that mocks their age.

"Don't forget Fedora," commands a woman with a show-me expression of bemused skepticism. Fedora Baratella settles next to me on a couch in the music salon. "It's a hard name to carry; a certain kind of personality is required." Arthritis may have halted her career as a concert pianist, but Signora Baratella appears in permanent overdrive. She spends her time running a dressmaking enterprise out of her room, gossiping with friends and recording her recollections for her grandchildren.

Leaning forward conspiratorially, Fedora talks about the Casa, which, she is quick to point out, she dearly loves. "The great dignity of the house remains, but the quality of the guests has gone down dramatically since I arrived ten years ago," she confides. "Musicians are all rich now; the Pavarottis don't retire here. We have choral singers, a flutist," she says, making a face. "They're not real musicians. Not *c-l-a-s-s-i-c-o*," she states in a stirring voice, stretching the word out letter by letter, thrusting an outstretched palm to the ceiling.

Lucia Borrelli enters the salon with Santuzza Cervetti on her arm and sits on a couch near Fedora and me. At 98, Signora Cervetti, a frail woman with clear brown eyes, is one of the most elderly guests (since my last visit, Signora Cervetti has died—shortly after her 99th birthday). As Fedora engages Santuzza in conversation, Lucia quietly tells me about Signora Cervetti's astonishing memory. Musical compositions memorized decades earlier are the only parts of her past that she can remember, Borrelli explains. "It's true for many of the guests," she continues; "many of the residents who can't remember whether their spouse is alive or dead can recognize a favorite piece of music, name the composer and the title. In Santuzza's case," the social worker comments, "we try to encourage her to continue playing, but there is one guest who insists it's bad for her and tries to prevent her from playing."

When asked why, Borrelli replies, shaking her head in frustration: "He wants to be the only person to play, and *he's* over 90. These rivalries go on and on, no matter their age; they may even be beneficial."

"It's not the rivalries," interjects Fedora. "It's the music. The ones who still teach, or play for their own pleasure, are the ones who remain young. Go on," Fedora urges Signora Cervetti, "show him."

The pianist sits down slowly at the grand piano and gingerly tests the keys. Gradually, the weak trills gather strength, and the Chopin waltz takes confident shape. The room grows hushed as others pause to listen. The pianist falters on a tricky passage, repeats it, then ends on a feathery pianissimo note, singing softly to herself. As the audience applauds, Cervetti frowns, shaking her head. "*Non perfetto*," she says, "*non ancora.*" Not yet.

Liana Lari, the manager of Casa di Riposo per Musicisti, places flowers on Verdi's tomb in the chapel crypt.

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By Jay Stuller

Climate is often a matter of inches and a little water

Planners ignore microclimates at their peril: mistakes can mean frozen crops, lower house values and camper vans blown off the highway

The snow crunches under the feet of Dennis Thomson as he leads an expedition up a hill on his 560-acre farm in the rolling terrain of central Pennsylvania, not far from the hamlet of Warriors Mark. The 54-year-old professor, head of the meteorology department at Penn State, points out the gnarled stumps of chestnut trees. They are beside the remains of an orchard planted in the early 1800s, now shaded by random oaks and pines.

"See the creek that runs down the hollow in that area about 100 yards away?" says Thomson, stopping to wipe the fog from his wire-rimmed glasses. "Because of the shape of the land and because the sun has already warmed Nittany Valley, cold air is still draining down the hollow. Just as water is pulled by gravity, the cooler air under these trees is heavier and sinking. The air right here is dead still, but down there in the hollow, I guarantee, the wind is blowing five to seven miles an hour."

Trudging farther up the slope, Thomson again stops, this time at the base of a living tree, around which is a small circle of bare soil. "Solar radiation is absorbed by the wood during the day," he explains. "Some of the energy absorbed by the tree is emitted as infrared radiation. That's why there's a snowless ring around the base. In fact, within 50 yards of us in any direction, we can probably find dozens of natural phenomena like these."

Its complex microclimate can keep Marin County, California, fogbound for weeks at a time in summer.

The soft-spoken son of two University of Wisconsin biologists, Thomson can masterfully wield the language of atmospheric physics. But at the moment he's engaging his guests—and himself—in the wonders of "microclimates." Small-scale interactions between the air, water, solar radiation, soil and vegetation, these tiny environments are often imperceptible to the untrained eye or just plain invisible.

A little way up the hill, Thomson stops again and pulls up a clump of moss from beneath the snow. From the moss hang prismatic hexagonal crystals of ice. Profound forces are at work here. Says Thomson: "The temperature difference between where the bottom of the crystal sits on soil and where the top of the moss touches the bottom of the snow layer is quite great. In fact, the difference is proportionally much greater than the difference between the temperature at the top of the snow and at our eye level. If that gradient were present in the larger atmosphere instead of confined beneath the snow, we'd be in the middle of a huge storm."

At the top of Bald Eagle Ridge, which is bare rock but for a few green thickets of mountain laurel, one looks northeast over Bald Eagle Valley. Just below the summit's northwest side are "flag trees," stunted oaks and pines with no branches near their tops and the existing branches pointing in a downwind direction. Each testifies to weather that's routinely much more severe on the windward side. "You're straddling two distinct microclimates," explains the professor, "and right down there, along the hillside, is where the state wants to build a major highway."

While highway planners took into account the route's vulnerability to snow, ice and some forms of fog, Thomson feels they missed one critical element. "The flag trees are a clue that winds up here are strong," he says. "We know that at ridgetops, wind speeds are amplified and accelerated. So in January, on a relatively windy day, I took some measurements along the proposed route. The gusts exceeded 70 mph, which is pretty close to hurricane force. I know the transportation officials didn't like my putting the testimony into the written record," says Thomson, "but those winds will tip over some tractor-trailers and recreational vehicles. Placing the highway in that microclimate will put lives at risk."

Microclimates are more often beneficent, benign or merely a minor annoyance. Relatively few of us notice that we're surrounded by these small climatic quirks. Yet microclimates can determine the kind of plants that grow best in a particular garden. They can make a house more expensive to heat or cool than another house less than a block away. The nuances of small-scale climate are critical to certain types of agriculture. And in building cities and clearing land of trees, humans induce far greater dynamic changes to microclimates than they do to the global atmospheric system.

Photographs by Cameron Davidson

Dennis Thomson measures wind velocity on Bald Eagle Ridge, where Pennsylvania wants to build a road. The head of the meteorology department at Penn State, he found local wind speeds of 70 miles an hour.

"In the majority of places where people live, we simply overpower the small environments around us, to the point where we're not really in touch with them," says Brent Yarnal, an associate professor of geography at Penn State and a colleague of Thomson's. "We control climate by heating and cooling homes with various forms of energy, and by the clothing we wear."

Do not feel guilty for modifying microclimates. Other species, including animals and trees, also create and even manipulate (however unintentionally) their own particular environments. Moreover, do not feel bad about failing to notice the little zones; microclimates are among the most peculiar of natural forces.

"It's relatively simple to understand weather, for it's something tangible that you can see, hear and feel right now," explains Yarnal. "With weather, we're usually looking at time scales of days, especially in the mid-latitudes, where a system rarely holds out for more than a couple of weeks." Climate is more difficult to understand; it is the statistical average of weather over decades, centuries and longer. "And just as weather varies with location," Yarnal says, "so does climate. We know that Arizona has a climate that's hot and dry, that Minnesota has a climate of cold winters, that the climate of the Pacific Northwest involves a lot of rain."

Microclimates, however, are manifestations of atmospheric influences that frequently prevail in areas not much larger than a square mile, and even in spaces as small as a half-inch. They're distinct anomalies within what atmospheric scientists call "local" scale climate, which ranges from about 100 yards to as much as 35 miles. The "meso" scale (and the scales obviously overlap) ranges from 10 miles to hundreds of miles. "Macro" scale climate can nearly encompass a continent.

Along with small horizontal scales, microclimates also occur vertically within the relatively thin "boundary layer" of air near the ground. This is where the atmosphere interacts with soil, rocks, water, vegetation and man-made objects. "It's the layer of air directly influenced by the nature of the underlying surface, such as its ability to absorb or reflect solar heat and thus to heat up or cool down," explains Tim Oke (pronounced OAK), a climatologist who is head of the geography department at the University of British Columbia in Vancouver. "It's also influenced by the drag on the air hitting those rough surfaces, which slows the wind and creates turbulence."

The atmosphere is always in motion, so that heat is continually being exchanged between the surface and the air above it. Rocks, city streets, moist earth and bodies of water absorb, hold and lose heat very differently. So the air moving over a mosaic of surfaces is fed with blobs of warmer and cooler air. The resulting differences cause warm air to rise and cool air to sink, which

Jay Stuller, who last wrote on Alcatraz, has an intense personal interest in microclimates: he lives in a cold, windy pocket of Marin County.

creates pressure differences from place to place, which drive breezes.

Valleys, for example, produce their own wind systems, adds Oke. At night, air over the valley slopes becomes its coldest and heaviest and thus is carried by gravity to the bottom of the valley. As that pool of cold air along the valley's base becomes heavy enough, it begins to flow down the length of the valley, much as the water in a river does. These downward-flowing air currents are called "katabatic" winds.

Most microclimates are more complex. One of the most striking examples is found in Marin County, California, just north of San Francisco, where summers are characterized by a thick Pacific fog that butts against the coastal mountains. So dense that it frequently fails to burn off in the afternoons, the fog may linger for weeks. But due east about 50 miles, in California's Central Valley, daytime temperatures often exceed 90 degrees F. Drawn to that lighter warm air, the cooler fog streams through the Golden Gate, and tendrils of the mist may extend inland for several miles.

Some of that fog spills over the Marin County headlands. In hill-sheltered areas of Mill Valley, a few miles north of the Golden Gate, afternoon temperatures may be in the high 60s, while the fog itself is moving around the hills on winds that are about 10 miles per hour. But near the town is a gap between the headlands and looming Mount Tamalpais, and it leads to a spot where Highway 101 cuts through a pass between the Tiburon Peninsula and a rise known as Horse Hill. Although the fog typically stops here, cold air roars on a straight downhill path to the shallow waters of the bay fronting the town of Corte Madera. Packing air in the low 60s, gusts of up to 30 mph can rip across the flatlands near the bay.

Move inland a mere half-mile, however, to where Mount Tamalpais shelters west Corte Madera and the town of Larkspur, and there is virtually no breeze. A balmy 72 degrees suggests that you are in a completely different state. This is one of the reasons that homes in west Corte Madera cost a good $10,000 more than comparable houses near the bay. It's the price one pays for a better microclimate.

While humans can take out bank loans to buy a better climate, natural organisms must adapt to the variations. "When you get down to tiny objects like leaves, microclimates can influence their very structure," says Oke. "For example, conifer needles have to maintain themselves at ambient air temperature. So they are thin, with very little bulk but a large surface area, which enables them to rapidly exchange heat with the air. As a result, needle temperatures never stray more than 2 degrees from the air temperature."

The author of a textbook called *Boundary Layer Climates*, the 53-year-old Oke, like Penn State's Thomson, derives as much pleasure from finding microclimate

The branches of this "flag tree," near Muir Woods in Marin County, have been shaped by strong winds.

Desert plants thrive on the arid east side of this San Francisco house. The west side is moist and humid.

Redwoods (left) create their own microclimate by trapping the coastal fog, ameliorating drought.

anomalies as from doing big-time atmospheric science. Born in southwestern England, Oke reflects that his native surroundings in the small town of Kingsbridge had much to do with his passion. "There you can see places where the trees, gorse and heather are bent and shaped by cold and blasting winds. But on the other side of the hill, in sheltered areas, you'll find plants that are almost subtropical."

Certain vegetation has a way of using, or even producing, microclimates. At the top of Thomson's Bald Eagle Ridge back in Pennsylvania, where those oaks and pines have a tough time growing, the lush and green mountain laurel seems a most odd thing: the soil is thin and holds little water. "But the laurel traps snow in drifts," Thomson says. "After a good storm, it will be several feet deeper around the laurel than anywhere else." Call it the Gaia Hypothesis writ small, an example of the link between living things and the atmosphere as we know it.

California's redwoods, which live in a relatively narrow band along the Pacific coast, are another example. "These groves are almost like cathedrals," says Brent Yarnal, who studied these coastal microclimates while at Sonoma State College. "The horizontal and vertical temperature gradients in a redwood forest are flat lines. The temperature at the ground and 100 feet up is about the same, since the trees control all that's beneath

Grassy area in a citrus grove near Frostproof, Florida, is slightly lower than the surrounding terrain. It can be 4 degrees colder than the higher ground—just cold enough to kill the trees that were planted there.

them." What's more, while redwoods need the heavy rainfall that comes in the winter, the trees also trap coastal fog. "Through the drip action," says Yarnal, "the redwoods squeeze dozens of extra inches of water out of the atmosphere each year."

To further elucidate the intricacies of boundary layers and heat exchanges, Oke's book contains a chapter on the "climates" of animals. Most critters, you see, regulate their internal temperatures, as well as their energy and water balances, through movements, postures and the types of shelters they seek.

In Oke's book, one photograph shows a litter of piglets subjected to cold temperatures. The animals huddle together in a corner of their box, drawing in their limbs and covering their noses. They conserve their metabolic heat output by transferring it back and forth among their bodies while reducing the surface area of exposed skin, thus minimizing heat loss to the atmosphere. A second photograph shows the piggies in warm conditions. Spread out and sprawled, the creatures are shedding as much body heat as possible.

Weather is, of course, critical to farmers. Once American farmers realized that the rain doesn't really follow the plow, growers tended to plant crops where they had the best chance of producing good yields, even if forced to use irrigation. But while all agricultural ventures are vulnerable to major weather events that come at the wrong time, microclimate is not a big concern with most crops. Except, that is, for citrus.

"We're always worried about freezes, which not only can destroy a crop, but the very wood in a whole grove of trees," says John Attaway, research director for the Florida Citrus Commission. When temperatures fall at critical times in the growing cycle, the difference between one grove surviving and the other dying is often a matter of microclimate. In Florida, this is most influenced by relative elevation and proximity to bodies of water.

"During the great freeze of 1895," says Attaway, "the groves around Keystone City in Polk County came through with relatively little damage. Just about everywhere else in Florida, the industry was wiped out. Keystone City is near several lakes of fairly good size. The water helped keep the area warm." That year, the people of Keystone renamed their city Frostproof.

Elevation is just as critical as water, for cold air sinking toward low ground can turn into "frost pockets." When cold, calm air settles over Florida in a "radiation freeze," temperature gradients follow a punishingly steep line as one moves downhill. "There was an experiment in which some researchers measured the temperature at about 320 feet above sea level, the highest point around," says Attaway. "They set up thermometers every

This vineyard in the lower Napa Valley is only about two miles from San Francisco Bay, in an area once thought too cold to grow varietal grapes. Because of local microclimate quirks, however, these pinot noir vines are doing just fine.

100 yards for a mile, down to 150 feet above sea level. The temperature at the high point was 46 degrees F. At the low point, it was 21 degrees."

Another agricultural giant, the wine industry, has tried to make use of microclimates. Until the early 1960s, California's vintners planted whatever variety they thought would sell best—no matter the soil or climate conditions.

In the past, for example, in the Carneros region just north of San Francisco Bay's cooling summer fog, cabernet sauvignon grapes simply didn't ripen all that well. Further north, in the upper reaches of the Napa Valley near Calistoga, where the weather is warmer and sheltered from coastal effects, growers had planted thousands of acres of pinot noir grapes, which need generally cool temperatures. Through experimentation and working with viticulturists at the University of California at Davis, winegrowers began matching varieties with prevailing temperatures. Most winegrowers now pay attention to their microclimates.

Clearly humans can work with microclimates—or modify them for the worse. "The rivers of ancient Persia were much larger than they are today," says Penn State's Dennis Thomson. "There are ruins of large ancient bridges that now cross trickles. The likely cause was deforestation, and I guess you could say the impact is more on a local or meso scale than micro." But within a 15-minute drive of Thomson's office in State College, Pennsylvania, one can find the ill-advised actions of mankind upon a microclimate that wasn't so great to begin with.

Separated from Nittany Valley by Gatesburg Ridge is another vale known as Barrens Valley, or the Scotia Barrens, after a mining town that's long since disappeared. In the late 1700s, French explorers noted that this area with acidic soil was less fertile than the fruitful Nittany but still supported a forest of oak, pine and white birch. Then, in the 1800s, Andrew Carnegie opened an ironworks in Scotia, stripped the surrounding surface land for its iron and cut down the forests to make charcoal for its smelters. Today, the Barrens has recovered, but its trees are stunted and gnarled and look different from those in other central Pennsylvania valleys.

One can't totally blame Carnegie, says Thomson. "The Barrens is unusual in that its sandy soil allows water to percolate deep into the ground," he explains. "Dry soil is less able to conduct heat but radiates it just as quickly as soil that's moist." What's more, this valley is contained by hills at either end; when cold air drains to its bottom, there's no place for the chill to go. "The minimum temperature in the Barrens is, on average, 10.5 degrees lower than at State College," says Thomson. "In that valley, on at least one day out of every month of the year, you're likely to have a freeze."

Unlike the Barrens, cities are inherently hot. In fact, the study of "urban heat islands" is of great interest to climatologists like Oke, a leading authority on the subject. "It's not a new concept," he concedes. "In 1815 Luke Howard of the Royal Society of London published a three-volume study that included a comparison of the temperature of London and its surrounding rural areas. He didn't call it a 'heat island,' but he defined the principles perfectly."

Oke and others have added greatly to the understanding of urban microclimates. "In general, cities absorb more solar energy and store it better (in construction materials), and have fewer plants to cool the air than does undeveloped countryside," says Oke. "As a result, some surfaces in a city can be more than 50 degrees

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warmer, and the air a few degrees warmer, than in rural areas. At night, the city has trouble ridding itself of stored heat because thermal radiation is trapped among the buildings and the street. So the air temperature can sometimes be more than 20 degrees higher than in the surrounding countrysides."

Then there's Southern California. Some 150 years ago, before the Los Angeles region was developed, summer high temperatures averaged about 102 degrees. By the 1930s, when enormous orchards were planted and fed by water from the Sierras, summer highs averaged only about 96 degrees. As freeways and parking lots have supplanted groves, however, L.A.'s summer temperatures have climbed back to desertlike averages.

Cities as jumbles of physical microclimates

What Oke finds most interesting about cities is that they have so many physical microclimates—as opposed to the biological microclimates on a forested hillside—packed into a confined space. "Each building has its own materials, colors, shapes and such that reflect or absorb energy, or keep nearby areas in perpetual shadow," he says. "Cities can also reduce wind speed by at least 25 percent. All those tall objects create drag and spin off turbulence."

The canyons between buildings can shunt that wind in unusual patterns. Oke is asked how a person could be walking down one city street with a stiff wind at his back, but move over to a parallel avenue and, while strolling in the same direction, get a blast of breeze in the face. The bearded Oke jumps up at the question and moves to a drawing board on his office wall.

"Anytime you have a building taller than 25 stories, you're going to have some problems with turbulence at ground level," he explains, sketching a building and drawing arrows to show that some wind spills easily over the top. "But much like the situation with a ridge, wind is buffeting against an object that it can't pass through, so pressure builds up ahead, with a low pressure behind," Oke explains. "At ground level, this sucks air in behind the building in the opposite direction. The edges of buildings also cause turbulence near corners, which can flatten pedestrians. Now engineers install baffles and canopies to protect people."

There is still the "problem" of summer urban heat islands. A team led by Hashem Akbari of the Lawrence Berkeley National Laboratory that includes scientists from UCLA is working on a project to cool Los Angeles. Investigating the degree to which shade trees can cool houses (SMITHSONIAN, April 1990), they're also looking into various compositions of roofing materials. As Akbari told *New Scientist* magazine, "The urban heat island is a man-made effect. And if man is doing it, then man can undo it."

"Hashem and his group are on the right track," says Oke. "If you build roads and roofs of materials of light colors that reflect rather than absorb energy, then it's possible to cool a city, which in turn conserves energy and reduces air pollution. There are also ways to use trees in parks and around homes to modify neighborhood microclimates."

Windbreaks alone can produce microclimates. For centuries peasants have used little stone-walled planting enclosures on windy hillsides. "Knowledge of microclimates goes back to ancient times, and good gardening techniques were maintained through the Middle Ages in monastery gardens," adds Pam Pierce, cofounder of the San Francisco League of Urban Gardeners (SLUG). "In medieval gardens, you see fruit trees planted right next to walls, because the people knew that walls radiated heat, which led to better fruiting."

Like all microclimates, gardens are affected by hills, hollows and orientation to the sun. A fence built at a low spot on the northeast side of the property is going to impede the flow of evening drainage air, which makes it no place to plant tomatoes; in most places, says Pierce, tomatoes like to be planted next to light-colored walls, the better to absorb radiation. The thing is, the very shrubs and such that make for good gardens also make for a benign microclimate around the house.

With windows, location can be everything

And yet, like the difference between east and west Corte Madera, location is a matter of major importance. Dennis Thomson figured this out before he built his house at Hemlock Hollow Farm in the 1970s. And he didn't need a magic capsule to figure out the climate, just an anemometer, thermometers and the patience of a micrometeorologist. Thomson eventually picked a spot not far up the flank of Bald Eagle Ridge. His living room has large south-facing windows; full sun in winter obviates the need to use much heat in the house, except on the coldest of Pennsylvania winter days.

Where central Pennsylvania grows terribly hot and humid in the summer, however, Thomson and his wife, Joan, are about the only folks in the region who don't need an air conditioner. The house has windows placed near its corners, which promotes cross-ventilation. But the most savvy feature is that the house sits on a spot where a gentle afternoon drainage wind spills off the ridge and pours right through the open windows. "If we'd located the place ten yards further up the hill, or ten yards lower," says Thomson, "we'd miss that band of wind."

Thomson might call his house-building an example of applied micrometeorology. The same goes for his warning about the ridge-accelerated gusts near the proposed highway. To others, the little wonders of tiny weather are simply the stuff of microclimate magic.

Tim Oke of the University of British Columbia uses a hand-held infrared thermometer to measure differences in the heat radiation of buildings in downtown Vancouver. Below is an example of the results he obtains, valuable data for understanding the dynamics of cities as heat islands.

By Robert Wernick

The strange and inscrutable case of Ezra Pound

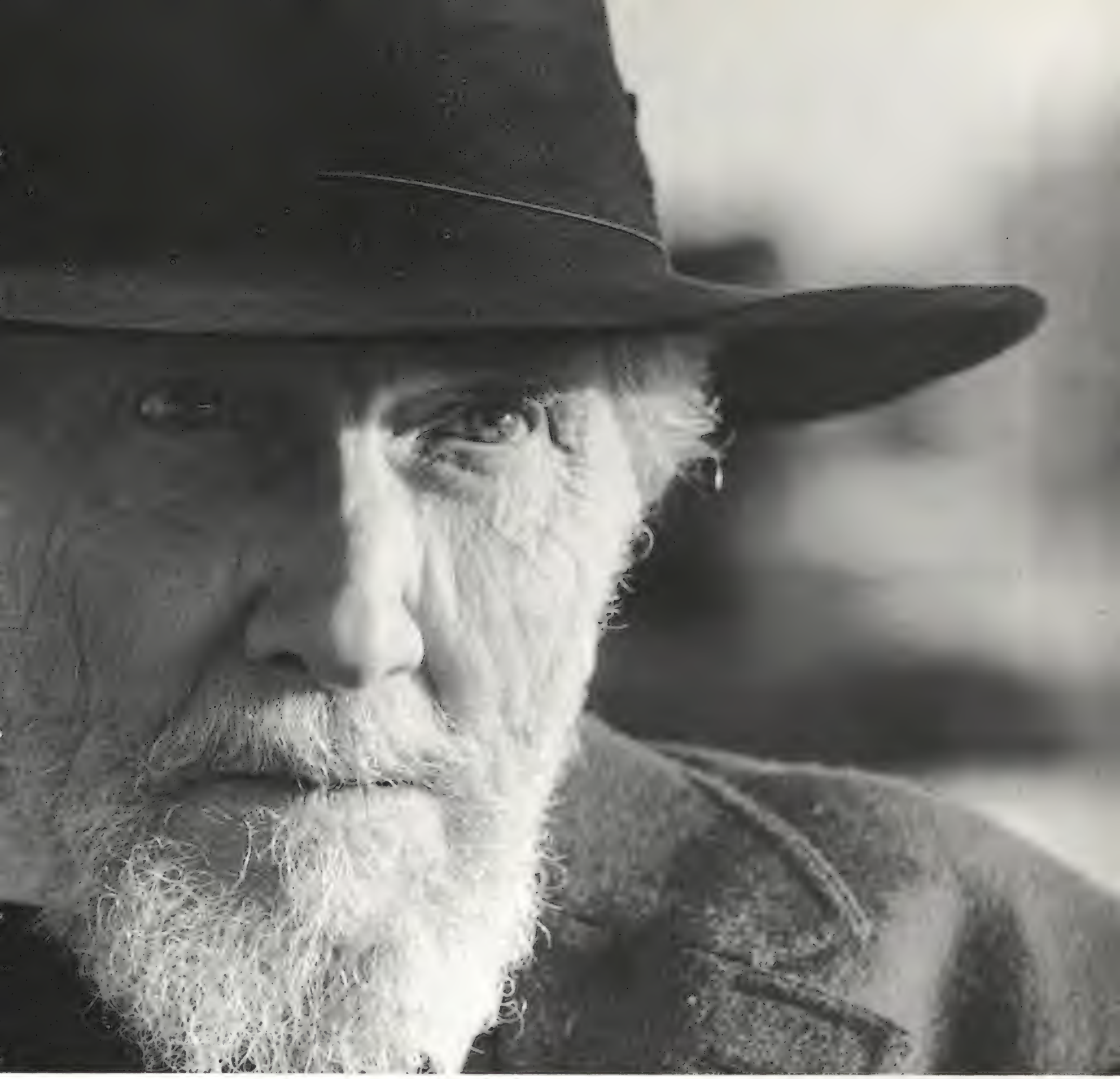
The expatriate American poet returned home in ignominy, and the postwar world watched as a literary giant was charged with treason

Portrait of Pound at 78, taken in 1964, revealed a man haunted by his bizarre and humiliating history.

Fifty years ago this month, the Department of Justice in Washington prepared to open what was expected to be one of the most sensational trials in American history. It was a trial for treason; unlike many other countries, the United States has witnessed only a handful of high-profile treason cases. The only two episodes that got the slightest attention in the history books of the time were those of Benedict Arnold, condemned to death in absentia by George Washington in 1780, and Aaron Burr, tried and acquitted in 1807. The treason of 1945 was front-page news, not so much because of the gravity of the crime alleged—as treasons go it was rather of the second class—but because of the identity of the defendant: Ezra Pound, considered by some of his contemporaries to be the greatest American poet of the 20th century and recognized by many as the most influential.

The U.S. Fifth Army, sweeping up the west coast of Italy the previous spring through the smoking ruins of Hitler's Europe, had passed through the fashionable seaside resort of Rapallo and there picked up an elderly bearded American gentleman with a volume by Confucius in his pocket. The first soldier who came across him tried to sell him a bicycle. Within a few weeks, the man had been arrested and was locked up behind the barbed wire of the U.S. Armed Forces Disciplinary Training Center near Pisa.

The officer in charge was off on compassionate leave in America, and his assistant had no idea who this new and odd-looking prisoner might be, but he judged, from the excited tone of coded cable communications pouring in from Washington, that he must be a particularly dangerous one. He had him shut up in a cage measuring 6 by 6½ feet, and there he remained, forbidden to speak to anyone, with bright lights shining through the bars at night, through three weeks of a hot Italian summer. Suffering from severe fatigue and claustrophobia, he was at length removed to the medical enclosure, where he could sleep in a pup tent, circulate among guards and other prisoners, read newspapers. There he



Whatever possessed a poet of genius, renowned for his personal generosity, to make radio broadcasts on behalf of Italy's Fascist regime remains a mystery, one that puzzled and tormented even his closest friends.

quickly succeeded in recovering his bounce and vigor.

For the young inmates and their guards, he was a bizarre and grandfatherly figure, the object of universal curiosity and some affection as he went through fencing exercises with a broomstick, helped illiterate prisoners compose letters to the folks at home, and sat down every evening at the typewriter in the dispensary to tap out line after line of poetry.

By this time everyone knew who he was and why he was there. He had been indicted by a grand jury in Washington, D.C. for the crime of treason against the United States of America.

It was a brand-new kind of treason, one not available to traitors in previous wars: propaganda for an enemy state by radio. Pound had been broadcasting twice a week over the shortwaves of Radio Roma ever since February 1940, when America was still neutral in World War II. He wrote his own scripts and delivered them with

gusto in the pseudo-hick dialect he had been perfecting over the years. (In point of biographical fact, there was nothing rustic about him; though born in Hailey, Idaho, he had been brought East as a little boy when his father was appointed assistant to the assayer at the U.S. Mint in Philadelphia, had gone to Hamilton College and the University of Pennsylvania, and would retain, for all his life, vestiges of the upper-middle-class mentality of the Main Line.)

The scripts covered economic, historical, political and cultural subjects, tumbling over one another in such impulsive and unpredictable order that some Italian officials suspected he was transmitting military secrets in code. He was, in fact, expressing his sincere and violent enthusiasm for a currency reform that would solve the world's economic problems and for a Fascist totalitarian regime that would clean the muck out of modern life, and proclaiming his still more violent hatred for Jews, the Bank of England, Franklin Roosevelt ("Stinkie Rosenstein"), Winston Churchill, publishers, nightclubs, usurious popes, muddy painters like Rembrandt and emotional composers like Puccini ("Spewcini"). The Italian Ministry of Popular Culture, which sponsored the broadcasts, was naturally more interested in his stance that America should never enter a war against Germany and Italy.

In Paris and London, Pound, here in a 1938 portrait by Wyndham Lewis, was a central figure in a literary circle that included James Joyce and T. S. Eliot.

Browsing in a Paris bookshop (1921), Pound personified the pensive poet.

Pound was the kind of man who had solutions for all human problems, including traffic (curved streets flanked by 40-story buildings with underground parking for 20,000 automobiles each), the feeding of Italy (grow peanuts), the geopolitics of the Far East. One proposal to straighten out the latter was to have the Japanese and Chinese drive the Australians ("that dirt") out of Australia. By a curious coincidence, this went out on the airwaves on December 7, 1941, at almost the precise moment that Japanese bombers, apparently going in the wrong direction, reached Pearl Harbor.

Four days later, Mussolini declared war on the United States, and the U.S. Congress declared war on Italy. Pound was now an enemy alien and, under international law, might have expected to be sent off with his English-born wife, Dorothy Shakespear, and his American-born mistress, Olga Rudge, to an internment camp. Instead, he was allowed to continue the comfortable schedule he had worked out for himself. For three weeks every month he would divide his time between the apartment he shared with Dorothy on the Rapallo seafront and the house he shared with Olga up the road in the hills. The fourth week he would spend in Rome, hobnobbing with Fascist officials and military brass, recording a month's worth of broadcasts in the radio studios and collecting his fee of 350 lire per broadcast from the Ministry of Popular Culture.

This peaceful and productive life came to an abrupt end in the summer of 1943 when Mussolini was booted out, and Italy changed sides in the middle of the war. Pound would never forgive those Italians who betrayed the man he was proud to call "the Boss." He idolized Mussolini. When Hitler had the Boss rescued from captivity and set Mussolini up as head of a Fascist "republic" in the town of Salò in the Italian north, Pound soon showed up to renew his allegiance and before

long was a presence on the radio again.

He made one broadcast to the American troops, telling them that the men who overthrew Mussolini should all be shot. But from then on he was chiefly occupied with writing scripts for others to read and giving editorial advice to other propagandists. He received about 8,000 lire a month, a modest sum.

He also spent a good deal of time writing scores of pamphlets, newspaper articles and occasional propagandistic verse. He offered the youth of Italy a model of heroism in a poem ("Canto LXXIII"), a copy of which he presented to the Boss and which was printed in a naval newspaper. In it, the poet has a vision of a country girl—a bit chunky, but lovely—in Rimini by the Adriatic, who nobly leads a column of Canadian troops into a minefield that her brother has just laid: "What splendor! / To hell went the enemy / twenty of them dead. / Dead was the maiden / among all that scum . . . / Glory, glory, / To die for your country . . . / What a beautiful winter! / In the north the nation is reborn / O that girl! / Those girls! / Those boys! / all in black uniforms!"*

So far as is known, no Italian girl or boy was stupid enough to take the poet's advice and lead Allied troops into a minefield. In fact, there is no reliable evidence of any damage whatever having been done to the American Armed Forces or the American war effort by Ezra Pound's broadcasts. The reason is not hard to find. The broadcasts, written with all the author's customary vigor and erudition, were cast in the same style as the *Cantos*, the long poem sequence on which he had been working for 25 years. It was a style that guaranteed he would have no success with a radio audience.

Pound called this style the "ideogrammic method," which means that whenever something comes into your mind you compact it into a stark, striking image, "a luminous detail," and then as your mind leaps or drifts some-

Robert Wernick recently wrote on the life and times of Herman Melville.

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Clockwise from top left, that's Jack Daniel, Jess Motlow, Lem Tolley, Frank Bobo and Jess Gamble. (Jimmy's in the middle).

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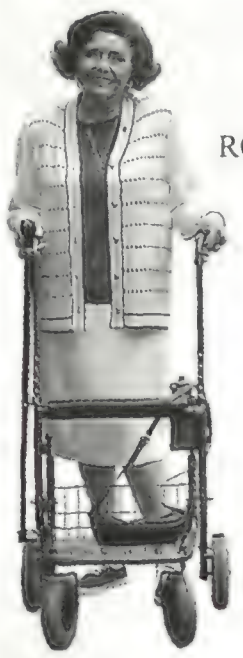

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where else, you create another image, and you leave it up to the reader to work out what connection there may be between them. Most of the early readers of the *Cantos* had no idea of what they were about, and it has taken the labors of generations of scholars to elucidate their mysteries.

Radio audiences of 1940-45 had no such critical apparatus to help them and could hardly be expected to keep up with a man who introduced himself genially as "Uncle Ez," and who then bounced and bounded from image to notion, from Confucius to Adolf Hitler ("Brother Adolf, I hand it to him that he is more efficient than I am"), from the suppression of the Pennsylvania Colony's paper money in 1750 ("MAIN cause of the American Revolution") to Cleopatra. Even his most devoted admirers have had to concede that as practical propagandist he was a failure all along the line.

This was immaterial to the lawyers in the Department of Justice who were collecting evidence for his trial for treason. The ineptitude of the perpetrator did not, from the point of view of the law, affect the criminality of the deed. (When German soldiers in civilian clothes were landed by submarine on Long Island in 1942 to sabotage industrial installations, they were arrested before they had a chance to cut a wire or set off a bomb. Most of them were executed nevertheless.)

Pound, sitting for six months in the Disciplinary Center while the government built up its case, had every reason to be scared to death. It is true that he always cultivated what Olga Rudge called "a persistent refusal to face any facts which do not fit into how he would like things to be." Still, he was never as total a fool as such statements made him out to be. He had a lively intelligence and a keen eye. He read the daily papers and *Time* magazine. He knew, and noted angrily in his poems, that the public men he most admired—men like Benito Mussolini in Italy, Vidkun Quisling in Norway, Pierre Laval in France—were being shot down like dogs to the savage approval of their countrymen. He knew that William Joyce, "Lord Haw-Haw," the most famous radio propagandist of the war, whom he had more than once consulted for technical advice, had been condemned to hang in London. And he knew that there were people in America who were howling for his blood.

There was a special hatred felt at the

Even before the start of World War II, Pound demonstrated a penchant for pontificating: in 1939, the poet holds forth before New York journalists.

time against what were called "radio traitors," a direct personal hatred of the men and women who had come sneaking, over the airwaves, into people's own living rooms to sneer and tell them that their sons and brothers and husbands were fighting and dying in a war that, Pound said in 1942, "you are not going to win. None of your best minds ever thought you could win it. You have never had a chance in this war."

Judicious hindsight 50 years later makes it easy to see that in reality, the chances of Pound's being put to death were practically nil. Other Americans who had broadcast for the enemy—Robert Best and Douglas Chandler for Germany, Iva d'Aquino ("Tokyo Rose") for Japan—were much more serious figures than Pound. They were tried and found guilty of treason, but not one of them was condemned to death.

However, neither Pound nor his friends nor his lawyer could have known that when he was flown to a jail cell in Washington in November. He had three possible lines of defense.

One was that he was a great poet, a genius, and geniuses are above the laws that apply to ordinary people. This is an argument that almost everyone accepts when applied to geniuses who have been dead for centuries. Few people today have the slightest concern about whether the government of Florence was right or wrong in condemning Dante Alighieri for crimes against the state in 1302. Or whether Henry the VIII committed an atrocity when he had the preeminent English poet, Henry Howard, Earl of Surrey, beheaded for treason in 1547. But the argument cuts little ice when the genius is still around in the flesh, amid the passions of the living world.

A second defense could be that Pound was right all along. In choosing Hitler and Mussolini over Churchill and Roosevelt, he had championed "light against filth." The United States, "sold to the Rothschilds," had taken the wrong side. Pound would hold firm to this conviction through all defeat and disaster. His wife, always his

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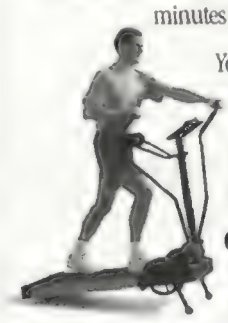

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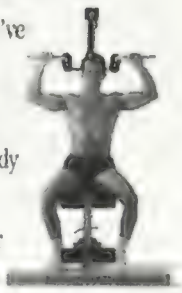

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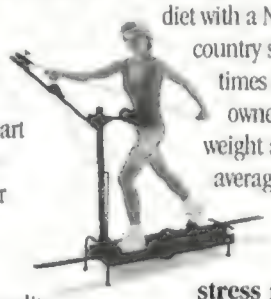

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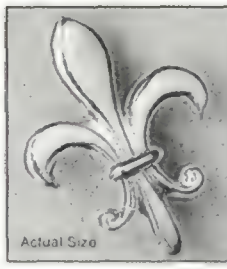

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faithful mouthpiece, said in 1948: "He did not commit treason. The treason was in the White House, and people are beginning to see that at last."

People in America, however, definitely did not see that in 1945, and it would not have made an effective defense in court. Pound shrewdly tried to keep his more belligerent writings out of sight for years; the poem about the Rimini heroine was not published in its proper place in the *Cantos* until 1986, and then only in Italian.

A third defense, and the one that Pound repeatedly said he would be proud to make, was that in speaking over Italian radio he was exercising his rights as an American citizen. Right or wrong, popular or unpopular, it was his belief that America was fighting the wrong war; under the First Amendment he had a perfect right to say so.

But in 1945 the country was pretty well united in hatred of the enemy and in no mood to forgive an unabashed apologist for that enemy. Most of Pound's friends were convinced that no defense would work for him in court and any jury would be only too glad to condemn him to death.

This posed an agonizing problem for his friends, who included many of the most famous writers of the 20th century. Since the day he landed in London in 1908 with his flaming beard, his velvet jacket and his mission to change the course of English poetry, Pound had been a commanding presence in the world of letters. If contemporary poetry sounds different, looks different on the printed page, from the traditional poetry of the 19th century, it is in large part due to the practice and endless inflammatory preaching of Ezra Pound.

It was not simply that he influenced the style of younger men and women. With boundless energy, and a generosity as rare in poets as it is in any other profession, he devoted vast amounts of time and effort to encouraging penniless young writers like James Joyce, D. H. Lawrence, Robert Frost and Ernest Hemingway, getting them published, writing enthusiastic reviews, collecting money to pay their rent.

Hilda Doolittle, whom he had once courted in the tree house behind her parent's home back in Pennsylvania and whom he called "Dryad" because she reminded him of a shy, wild wood nymph, timidly showed him some manuscripts of her poems in the tearoom of the British Museum one day in 1912. "Why, these are good, Dryad!" he exclaimed, and took out one of his sharp red pencils and shortened a few lines, changed a few adjectives and signed at the bottom: "HD, Imagiste," with one stroke creating a new school of poetry and conferring upon Doolittle the name under which she appears in the anthologies.

Years later his young friend Tom Eliot, a clerk at Lloyds Bank, came out

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In a photograph taken on the day Pound entered St. Elizabeths, the poet did appear suitably deranged.

of a Swiss psychiatric rest home with a long, diffuse and rather mean-spirited lament about the woes of a sensitive poet condemned to live among the people of London. Pound slashed away at it, cut out half the lines and hectored the author into changing others. The result was "The Waste Land," now considered the classic statement of the mood of disillusionment and despair that engulfed the world after the mass slaughters of World War I.

Pound, like most other intellectuals of the time, was convinced that modern Western civilization was rotten to the core, eaten away by the corrupt politico-economic system of capitalist democracy ("pejorocracy," or rule of the worst, was his term for it). For a while he thought that Lenin and the Bolsheviks had found the right formula, but he soon found greater promise of salvation in Fascism. He considered himself an expert on politics and economics, and he saw no reason why he should not put the world straight on both counts. Beginning in the early 1930s, he began issuing instructions to the world, though the world paid no attention. Pound was the quintessential spoiled only child, and the less attention he got, the more he became shrill and nasty, eventually emerging as

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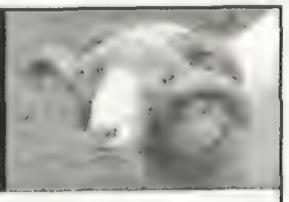

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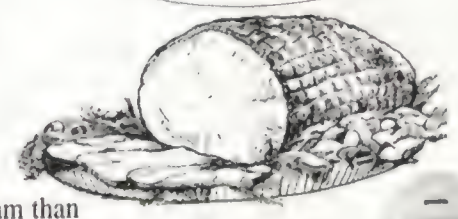

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Surely, said the poet Archibald MacLeish, who had been Assistant Secretary of State at the time the broadcasts were being made, "treason is a little too serious and dignified a crime for a man who has made such an incredible ass of himself, and accomplished so little in the process." "He deserves punishment and disgrace," said Hemingway, "but what he really deserves most is ridicule." It was Hemingway who was the first to suggest out loud that Pound might be declared irresponsible because he was "obviously crazy."

The same idea had occurred to Pound's lawyer, Julien Cornell, who on November 20, the first time he saw his client, brought up the subject of a possible defense of insanity, and as he reported later, "Pound had no objection. In fact, he told me that the idea had already occurred to him."

At a court hearing six days later, the judge ordered an examination of Pound by four psychiatrists, of whom the best known was Dr. Winfred Overholser, superintendent of St. Elizabeths Hospital, the federal asylum in Washington. The doctors signed a report written by Dr. Overholser that described Pound as eccentric, querulous, egocentric, grandiose and distractible, and went on to conclude that he was "mentally unfit to advise properly with counsel or to participate reasonably and intelligently in his own defense. He is, in other words, insane."

Within a few days, a jury trial was scheduled to determine if Pound was really crazy or just faking. There were many who agreed with prosecution lawyers that he was legally sane. The

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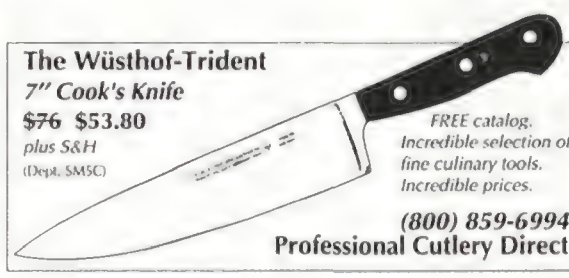

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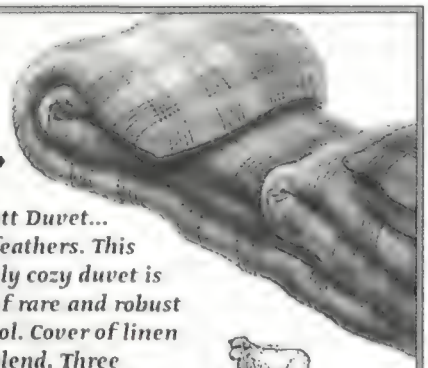

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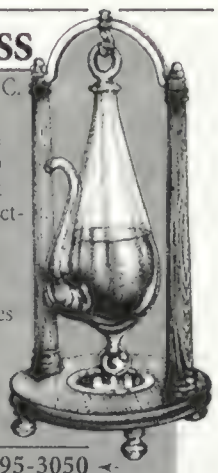

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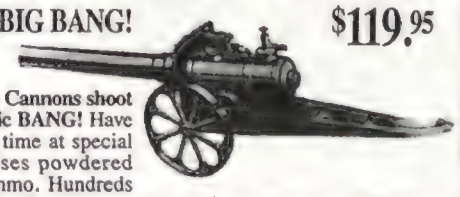

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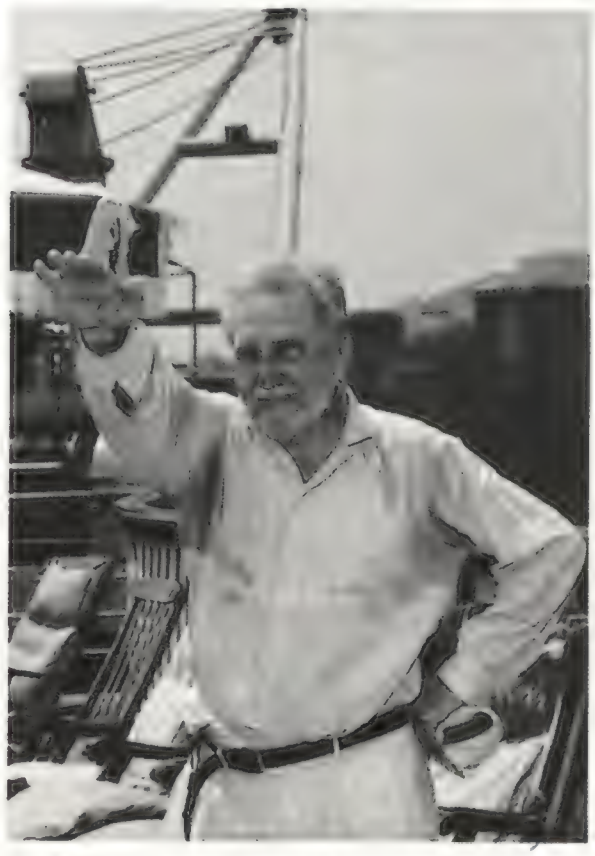
psychiatrists at St. Elizabeths who were to see him regularly for years to come were virtually unanimous in their opinion that he was never psychotic.

The acquaintances who visited him there saw nothing abnormal. This was the same old Ezra they had known in London and Paris and Rapallo, alternately charming and unbearable, the same warmhearted friend, lynx-eyed critic, crackpot preacher (giving the impression, T. S. Eliot said, of a man "trying to tell a very deaf person that the house is on fire"), faithful Fascist, foulmouthed bigot.

Judge and jury finally convened to consider the case on February 13, 1946. The prosecution struck most observers as rather half-hearted about attacking the testimony of the psychiatrists, and it has been surmised that they thought it might be simpler and more economical to let Pound be locked up in an insane asylum rather than go through a long and potentially embarrassing criminal trial.

The case against the defendant had hidden legal flaws. The U.S. Constitution is very strict about treason trials. For one thing, it demands two witness-



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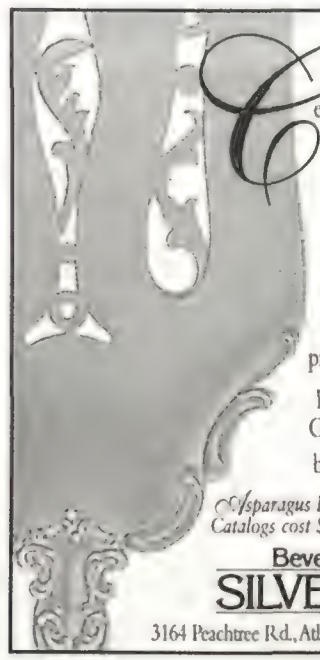

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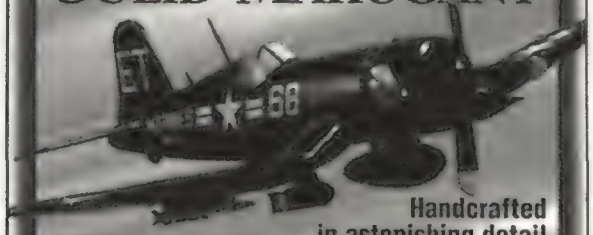

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es to every overt act. The overt acts in the indictment were radio broadcasts, and the only witnesses were Italian radio technicians who did not speak a word of English and whose testimony could easily be turned to ridicule by a clever lawyer. In addition, the most damning evidence against Pound, showing his long and well-paid collaboration, was contained in some 7,000 documents seized in his home in Rapallo by an FBI agent in May 1945. This agent had entered the house without a search warrant, and a court might well hold that this whole mountain of evidence was barred from use.

For whatever reason, the prosecution let the proceeding move along at a fast clip. For the most part, Pound sat in anxious silence. The jury, having had time to listen to the psychiatric evidence and to look Pound over, took less than five minutes to reach a verdict that the respondent was of unsound mind. Pound was delighted. "Cornell has saved my life," he said.

He was taken off to St. Elizabeths. No one could have foreseen that he would stay there more than 12 years. St. Elizabeths was old and dilapidated, understaffed and overcrowded, with some patients sleeping in the corridors. Pound called it variously his bughouse and his hellhole. Visitors who came to see him all speak of its oppressive atmosphere, with television sets going full blast and hollow-eyed patients drifting aimlessly about or creating their own mad theater. Yet Pound thrived. His vigor impressed everyone. He was cooperative with the staff and got on well with the patients. "I can get along with crazy people," he said, "it's only the fools I can't stand."

He told Julien Cornell on one occasion that if he had to stay in America—and the U.S. Government seemed in no mood to let a man accused of treason quit its shores—St. Elizabeths was as good a place as any. Indeed, it had certain advantages. For the first time in his life, he was totally free of money worries, getting bed and board for free from the government while royalties

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Upon returning to Italy, Pound divided time between his wife, Dorothy, and mistress, Olga; here, he and Olga take afternoon tea in 1964.

from his books piled up in the bank. He had all the time he wanted for chess or playing tennis and, above all, for writing.

He had a room of his own where he could type at all hours, and his output was prodigious. He wrote 25 more cantos; he translated a work by Confucius, 300 ancient Chinese poems, some diary entries by Mussolini and a tragedy by Sophocles; he dashed off scores of magazine articles and thousands of unsigned letters. (The anonymity was designed to head off questions about whether so productive an author was really as mentally incompetent as the doctors said he was.)

The best feature of St. Elizabeths was that it was in Washington, easily accessible to the kind of steady attention he needed, which would have been much harder to get in the quiet little sanatorium in Arizona where T. S. Eliot wanted to park him, or in a federal prison like Leavenworth in Kansas where he might have been sent if he had been convicted of treason. He could receive as many visitors as he wished; they wrote in swarms to reserve their hours. He received them, in groups of up to 15, in a screened-off enclosure in a corridor or out on the hospital's spacious lawns while he fed the squirrels.

Some days the visitors were distinguished literary figures like Eliot, Robert Lowell, Marianne Moore, Kenneth Clark. Some days they were professors and graduate students and Chinese scholars. Most days they were a raggle-taggle collection of young people, described by Pound's daughter as sloppy and ignorant, not knowing so much as the titles of his poems but enthralled with the chance to listen to his nonstop talk.

Years passed, the poet approached and passed his 70th birthday, and there was increasing discomfort and embarrassment in America and the world about the whole situation. People actually convicted of serious war crimes were being let out of prison one after the other. Tokyo Rose got out after six years.

The trouble was that as long as Dr. Overholser kept sending in annual reports that Pound was still insane, he could not leave St. Elizabeths. He could have asked at any time for a new hearing to prove that he was quite capable of understanding the charges

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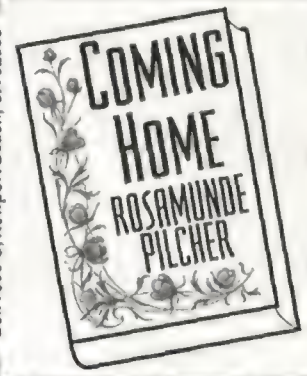

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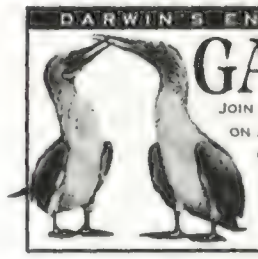

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against him. But then he would have had to go on trial for treason. And though he often rehearsed the eloquent defense he could make for himself, Uncle Ez was not going to walk into the minefield of a treason trial.

In all those years he never made a serious effort to get himself out of St. Elizabeths. When Cornell wanted to appeal his case, Pound and his wife, Dorothy, refused to pursue the matter. When his daughter asked him what steps he was taking to get out of his hellhole, he changed the subject. An exasperated T. S. Eliot told her, "Your father does not want to accept freedom on any terms that are possible."

If he would do nothing for himself, it was up to his friends to try to get him released by working quietly through government channels. The trouble was that controversy over Ezra Pound always kept boiling up again. He could not stay long out of the public eye.

In 1946 a literary storm arose when Random House announced that it was going to cut Pound's poems out of the new edition of its anthology of English and American poetry. It had to back down when authors accused the publisher of crude political censorship.

A bigger furor arose two years later, with the publication of *The Pisan Cantos*, the poems that Pound had tapped out behind the barbed wire. The form was familiar enough. The tone, however, was something new—it was deeply personal. Instead of a lavish display of book-learning sprinkled with spicy anecdotes and dreamy bits of landscape, the new cantos offered the experiences of an old man in prison clutching at any support to keep him from despair: the white-breasted birds perched on the wire like half-notes on a music staff, the mother wasp artfully building her nest, the old poet folding his blankets in his tent, a soldier who made him a table out of packing cases and told him, "Doan you tell no one I made it." There was now a note of genuine grief for the fall of Benito Mussolini, "the twice-born, the twice-crucified," whose head hung down like a

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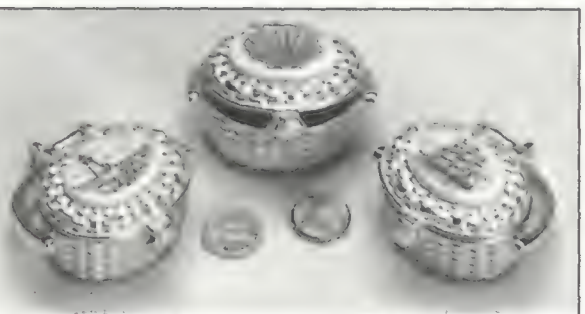

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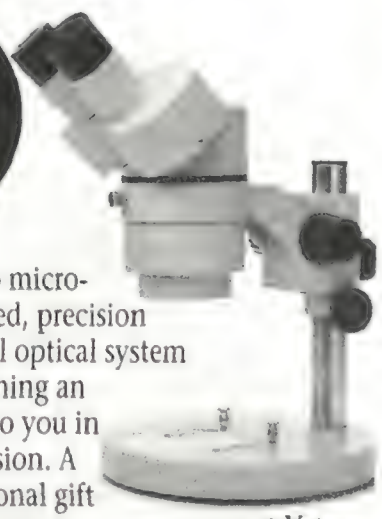

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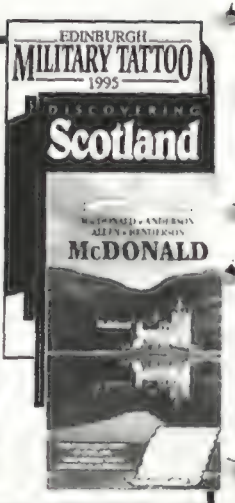

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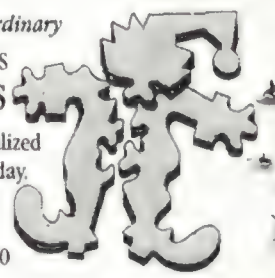

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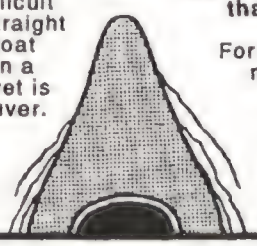

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Canto XVII

So that the vines burst from my / fingers
And the bees weighted with pollen
Move heavily in the vine-shoots:
  chirr—chirr—chir-rikk—a / purring sound,
And the birds sleepily in the / branches.
  ZAGREUS! IO ZAGREUS!
With the first pale-clear of the / heaven
And the cities set in their hills,
And the goddess of the fair knees
Moving there, with the oak-wood / behind her,
The green slope, with white / hounds
  leaping about her;
And thence down to the creek's / mouth, until evening,
Flat water before me,
  and the trees growing in water,
Marble trunks out of stillness,
On past the palazzi,
  in the stillness,
The light now, not of the sun.
  Chrysophrase,
And the water green clear, and / blue clear;
On, to the great cliffs of amber.*

Canto II

Hang it all, Robert Browning,
there can be but one "Sordello."
But Sordello, and my Sordello?
 Lo Sordels so fo di Mantovana.
So-shu churned in the sea.
Seal sports in the spray-whited / circles of cliff-wash,
Sleek head, daughter of Lir,
  eyes of Picasso
Under black fur-hood, lithe / daughter of Ocean;
And the wave runs in the beach- / groove:
"Eleanor, ελεναυς and ελεπτολις!"*

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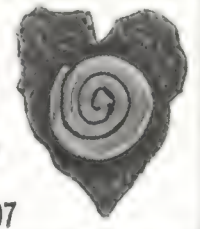

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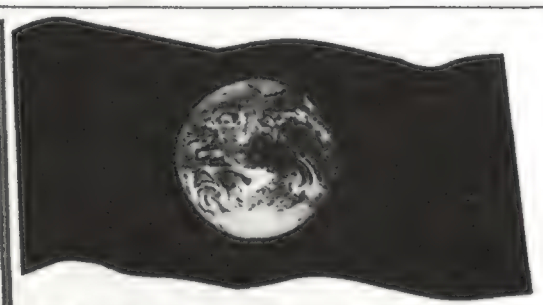

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bullock from a butcher's hook in Milan.

The quarrel between admirers and detractors of the *Pisan Cantos* soon became highly politicized. As it happened, several of Pound's friends were members of the Library of Congress selection committee for the Bollingen Prize, awarded annually for the best volume of poetry printed in America. The first Bollingen recipient, in 1949, was Ezra Pound for his *Pisan Cantos.*

Members of Congress felt only outrage when they learned that the government was officially honoring a man who only a few years before had been the hired hand of an enemy government and was still proud of it. The furor ensured that, for years to come, no one in government would touch the case of Ezra Pound with a ten-foot pole.

Years passed, election followed election, and then in the early 1950s, when it seemed that the public had forgotten about Pound, there he was back on the front pages again. Congress was moving toward passage of the first major civil-rights law of the 20th century. There were young racists in the streets, cheering for white supremacy and the Ku Klux Klan, rioting against the integration of schools, burning crosses. Reporters discovered that some of these young people had listened to Pound's lectures on the lawn of St. Elizabeths and had exchanged hundreds of letters with him. There was another uproar in the press. Once again the politicians told Pound's friends that they could do nothing in such an atmosphere.

It was not until 1957 that public opinion and the political climate cooled enough to put a quiet end to the situation. A propaganda blitz led by Robert Frost and Archibald MacLeish persuaded the Eisenhower Administration that, with so many Nazi war criminals having served their time and now out walking the streets, it was doing no one any good to keep a permanent lock and key on a septuagenarian poet who was being talked of for the Nobel Prize in Literature.

It was Dr. Overholser who, as he had back in 1945, found the solution. He

prepared an affidavit saying that Pound was permanently and incurably insane, but that he was not dangerous and it would be a needless expense to keep him in a government hospital. The government having no objection, on April 18, 1958, the District Court dismissed the indictment for treason, and after almost 13 years Ezra Pound was a free man, charged with no crime, but legally incapable of signing a check or any official document. He was in no hurry to leave St. Elizabeths, where some dental work was scheduled, and it was not until May 7 that Case No. 58102, Pound, Ezra, was officially closed with the notation: "Condition upon discharge: unimproved."

He was certainly unchanged. It was the old jaunty Pound who came bouncing out of the bughouse, brilliant, bombastic, furiously energetic.

After a brief round of visits, he sailed for Italy, sharing a cabin with his wife and a young lady from Texas, Marcella Spann, who had been a regular visitor at St. Elizabeths and was now his secretary. When the ship docked in Naples, he greeted the swarm of press photographers with a snappy Fascist salute.

He would live for almost 15 more years, increasingly sad years. His writing sputtered out. His private life was for a while a battleground of wife, daughter, Marcella Spann and his mistress, Olga Rudge. Olga finally bore him off in triumph to her apartment in Venice, where he was in and out of clinics and nursing homes.

There were periodic flashes of the old vigor, when he might go bounding around Rapallo or Venice pointing out the beautiful spots he had loved so well to disciples who could hardly keep up with him. A Fred Astaire movie might set him tap-dancing along the canals of Venice. Once he turned up in a parade of goose-stepping neo-Fascists with swastika armbands in Rome. At the age of 87, when the gondola-ambulance came to take him to his deathbed in the hospital, he insisted on getting up and walking downstairs to meet it. But more and more in those last years he was sunk in long, brooding silences. He told visitors that his cantos were a botch, that he had been "wrong, wrong, wrong. . . . Eighty-seven percent wrong. . . . I was as stupid as if I had been a telescope used the wrong way. . . ."

Ezra Pound never got around to explaining just what he had done that was wrong. He was man enough to tell Allen Ginsberg at lunch in Venice in 1967 that he was most ashamed of his anti-Semitism, which he called "a stupid suburban prejudice." Ginsberg was too much of a gentleman to remind him that he had never spent a day in a suburb since he left Wyncote, Pennsylvania, 59 years before.

Pound spent his last years in Venice, a city that he venerated in his poetry: during the 1960s he became a familiar sight, a frail octogenarian visiting his favorite haunts, such as the Piazzetta di San Marco.

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A Byzantine Journey
John Ash
Random House, $25

I was in Paris during my sophomore year of college when I started reading Gibbon's *Decline and Fall of the Roman Empire.* I made my way through the first volume, immersed in the decadence of the late Roman Empire, an era riveting in its excesses, but at least passingly familiar. Then I entered an entirely new and exotic realm—the eastern Roman Empire, a dominion that survived the fall of Rome in 476 by almost a thousand years.

The Byzantine Empire lasted until 1453, when Constantinople (present-day Istanbul) was conquered by the Ottoman Turks. Through the past two centuries, fabled Byzantium was reduced to little more than a small principality hemmed in by the Ottomans. Eventually, modern Turkey stood in its stead. John Ash is our guide to all these Byzantiums, past and present, in his engaging pursuit of a lost and legendary world.

Ash's epiphany, when it came to Byzantium, was similar, I found, to my own. "It happened," he writes, "on a dull afternoon in school. I had been reading a condensed history of the Roman Empire and was astonished to discover, from a brief final paragraph, that an empire still calling itself Roman had continued to exist until the improbably late date of 1453."

For Ash, a British-born writer now living in New York City, this chance encounter marked the beginning of a deep connection with a remote and beckoning world. "I soon learnt," he writes, "that, in some quarters, this empire had a very bad reputation. It was synonymous with decadence and de-

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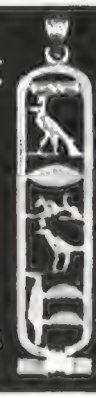

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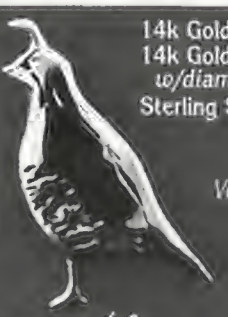

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cline. Even at this early stage it struck me as unlikely that a civilization could have declined continuously for a thousand years. Such longevity surely suggested a people and a culture possessed, at the very least, of great reserves of tenacity and vigor."

Ash is relatively unconcerned with modern Turkey. His passion is the environs of Istanbul, the Anatolian plateau, and the remnants of the Roman Empire of the east. His journey begins in Istanbul, and he quickly makes his way to the Hagia Sophia. One of the oldest, grandest and most intimidating of the world's gloomy cathedrals, it dates from the early sixth century when Emperor Justinian ruled the eastern Mediterranean. "The dimness of Hagia Sophia's interior tends to support the popular idea that the highest aim of Byzantine church builders was an atmosphere of mysterious murk amid which gorgeous images glimmered faintly by candlelight." Still, says Ash, Byzantine builders were actually more interested in a "dazzling illumination," now lost to us under layers of time and dirt.

From Istanbul, we are led to the proximate imperial cities of old—Iznik (Nicaea) and Bursa—and then south, skirting the eastern plateau along the mountains of central Anatolia. Along the way, Ash gradually fleshes out the chronicle of Byzantium. He is particularly interested in the later Byzantine Empire, after the tenth century. The 600 years following the reign of Constantine the Great (who, in the early fourth century, converted to Christianity and so began the widespread Christianization of the West) have received comparatively little attention. The lack of extant monuments from these years is one reason for this elision. Another is Ash's desire to undermine a deeply held prejudice that the later Byzantine Empire, the dominion encountered by the Crusaders, was hopelessly effete and corrupt.

The Comnenid family constitute the heroes of Ash's account. Time and again, he comes back to Alexius I Comnenus (who ruled from 1081 to 1118), his successor John II Comnenus (1118-1143) and Manuel I Comnenus (1143 to 1180). These were the emperors with whom the early European crusaders dealt, and they exemplified a refinement, subtlety, erudition and might at which the crude Europeans could only marvel. Alexius was, in Ash's description, "a master of psychology and polit-

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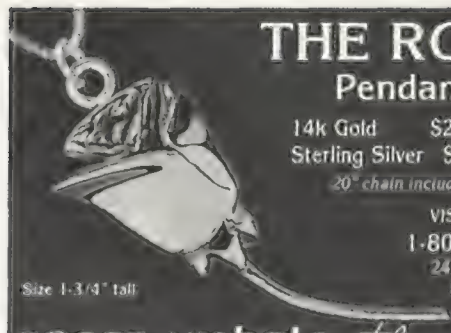

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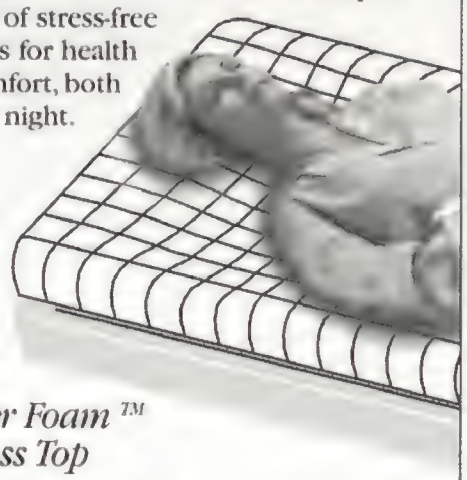

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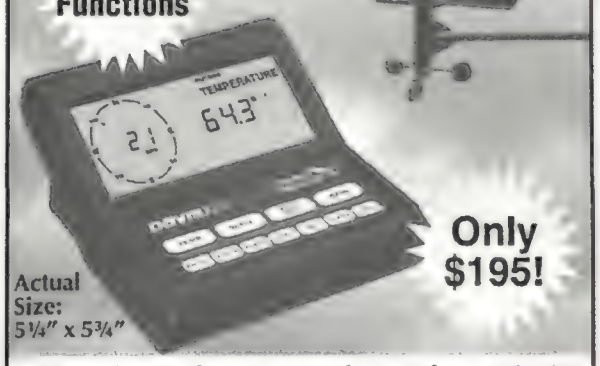

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ical theater." John was "renowned for the justice and benevolence of his rule" and Manuel was "famous for his magnificence and liberality."

The great tragedy of Byzantine history is not, for Ash, the final capture of the city by Mehmed the Conqueror in 1453, but the sack and destruction by the members of the Fourth Crusade led by the Venetians in 1204. The city was burned, the inhabitants killed or exiled, and much of the heritage of the past thousand years was lost. The emperors retreated to exile in Nicaea, and Byzantium never recovered. The Turks and Arabs, in centuries of war with the Byzantines, never acted so brutally.

It's a sobering reminder of how dark Europe's "Dark Ages" were. Though the Crusades may have ushered in the European Renaissance, they did so largely by bringing the truly barbaric Normans, Franks, Britons et cetera into contact with the vastly more advanced civilizations of Byzantium and the Arab sultanates of the Near East. As the Crusaders began their rampages, they fought the Seljuk Turks of Anatolia.

The Seljuks are given respectful treatment by Ash. He visits Konya, their capital and, by the early 1200s, one of the great cities of the Islamic-Mediterranean world and the resting place of the great Sufi mystic Rumi, who attracted both Christian and Muslim followers. Ash lavishes attention on that city's mosques, treasure houses of gleaming tiles and marble. He discovers, too, the Karatay Medrese, a building that once housed a center for Koran studies and today serves as the city's ceramics museum. "The glorious central space," he writes, ". . . is an interior that seems to mirror, with absolute calm, all conceivable intricacies of thought."

From the monumental remnants in Istanbul, to the magical surreal church caves of Cappadocia, Ash traverses the terrain of our forgotten heritage. Ultimately, that is the crucial theme: Byzantium is not foreign.

Upon his return to Istanbul at journey's end, Ash's entry into the dim and beautiful recesses of a church at the city's edge underscores this insight. The church of the Monastery of Saint Savior in Chora (known today as the Kariye Cami), containing extraordinary early 14th-century mosaics and frescoes, stands as a monument to all Ash reveres. "Taken together," he writes, "these [mosaics and frescoes] constitute one of the supreme masterpieces of European art, and deserve to be placed on a level with the nearly contemporary work of Giotto or the greatest achievements of the High Renaissance."

Ash is our armchair guide, and we are transfixed: "Here," he observes, "there is nothing tired or formulaic, nothing remotely decadent or pessimistic. Any unprejudiced observer who steps into the Chora today is likely to be overwhelmed by the brilliance and freshness of the vitrified colors, the shimmering fields of gold, the grace of the figures, the harmony of the compositions and the wealth of picturesque detail. There are peacocks and pheasants, groups of children at play, crags and windswept trees, fantastic architectural backdrops, billowing awnings and nearly cubist views of towns and cities. In *John the Baptist Bearing Witness of Christ*, a waterfowl grabs at a snake in a pool; in the *Annunciation to Saint Anne*, a bird flies toward a nest of squawking fledglings high in a tree. There is sorrow in the world of the Chora—mothers lament the deaths of their children, the blind, the crippled and the sick are very much with us—but there is also an intense delight in existence."

In Byzantium, we find a foundation of our culture. Schisms between Eastern and Western Christianity notwithstanding, Byzantine art, architecture, philosophy and theology are woven into the very fabric of Western history. The domes of Italian Renaissance churches come from Byzantine structures; the learning of ancient Greece was transmitted to the West from Byzantium and from the Arab caliphates who in turn inherited it from the emperors and scribes of the eastern Roman Empire; the trappings of autocracy that the crusaders observed at the Byzantine court led eventually to the royal absolutism of the Austrians and the French.

A Byzantine Journey is exotic, but only because so much of our own heritage has been forgotten or distorted. Ash reminds us that ancient Constantinople was not at such a cultural remove from modern Manhattan, with its bustle, complexity, ethnic diversity and crowds everywhere. I loved reading Gibbon. It will always be a great piece of literature. But it is time to lay his mistaken notions of the Byzantine Empire, decadent and dying, to rest.

Zachary Karabell writes from Harvard's Center for International Affairs.

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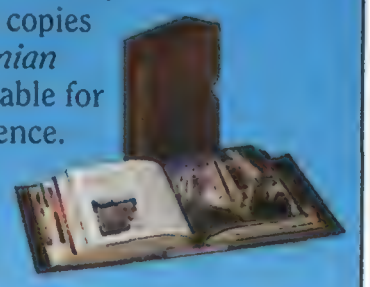

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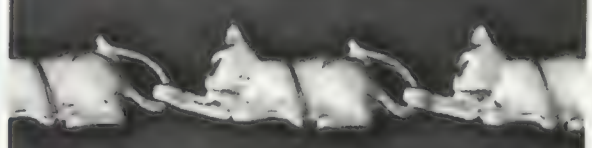

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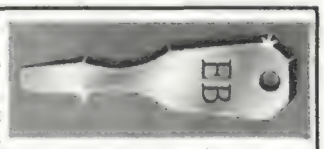

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By Robb White

Those Christmas lights could knock you off the roof or save your life

Country people didn't have electricity when I was little, so we used to go to town to see the Christmas lights. In those days, they had strings of colored bulbs stretched across the street, sort of like a ceiling of lights. It doesn't sound like much, but city employees worked all week putting them up. They used to have to stand on tall stepladders in the middle of the street to change bulbs. When the lights finally came on, it was spectacular.

Now they have these stylish little Victorian curlicues stuck on top of the streetlights. I guess the new decorations cost a bunch of money, and I know the city crews were glad to be able to get off the ladders in the middle of the street during the worst of the Christmas rush. But it just isn't the same.

We always had a parade for the children with the band marching under the lights and playing "Jingle Bells." Santa Claus (actually it was the local taxi driver) came behind in a little buggy pulled by a worthless bunch of Shetland ponies with phony reindeer horns hanging under their necks. Many a child was horrified at the sight of Santa snatching one of those reindeer back into line with a vicious jerk on the reins and a word or two. Some others, now grown, tell me they were shocked to see not the stump of a pipe in Santa's mouth but a great big Cuban cigar.

Every year, some folks went overboard when it came to decorating their homes. I remember in particular one schoolteacher, wearing a Santa costume, and his wife who always put on a spectacular display. Getting it ready was such a big job that it always pushed them to the last minute. They were never ready to turn the lights on until just before Santa was due to arrive. Cars full of people with sleepy children lined their street, waiting to see Rudolph and all the others up there on the roof. Recent arrivals in town who didn't know any better honked at the traffic jam. Neighbors pulled their blinds so nobody could see what kind of nonsense they were watching on TV. Meanwhile, the harried exhibitors clambered through shrubbery and crawled over the roof, crunching light bulbs under their knees and getting tangled up in extension cords. Somehow it usually came together, at least for a little while.

One time, though, it didn't. When the frantic couple finally got the extravaganza plugged in that night, the reindeer and Santa and his sleigh full of toys didn't light up. They unplugged everything, and the husband climbed back on the roof to wiggle the wires. Then he said, "Try it again, Baby," and the electricity nailed him at the same time it lit Rudolph's nose. The whole mess toppled from the roof in a blaze of glory that set the pine needles in the yard on fire.

One youngster I knew never got over the sight. What bothered her was not so much the destruction of the toys, the sleigh and the eight tiny reindeer (plus Rudolph) but the fact that there were *two* Santa Clauses tumbling off the roof. Fortunately, some of the people waiting in their cars were able to beat out the pine-needle fire or the whole house might have burned up.

When I told my uncle Hawkins that story, he said the prettiest Christmas lights he ever saw were on just one tree. He was in the Army Air Corps during World War II. On Christmas Eve in 1943, he and five other airmen got on a B-26 flying from Fort Knox, Kentucky, to Tampa, Florida. Uncle Hawk, as he was called, planned to get off in Jacksonville for a last visit home before shipping out to Europe. When the plane got to Jacksonville, it was socked in so badly the crew couldn't see the ground or the tower lights. They decided to fly inland, hoping conditions were better at training fields near Starke or at Cross City. When they passed where Starke was supposed to be, the fog was still so thick they couldn't see any fields near there either. They had no choice but to continue on to Cross City.

The plane didn't have much fuel, and the men began to worry. When they flew over Cross City, there were no lights because of the blackout and no gaps in the fog. They were trying to figure out if they had enough fuel to make it to the Gulf of Mexico to ditch the precious plane when, suddenly, they spotted what looked like one light shining through the fog. They went back and passed low over it. Then they saw car lights.

The aviators circled, keeping those lights in view, until finally they realized the cars had all lined up in two rows, illuminating a lane in between. They landed the bomber in soup so thick they touched down without even seeing what their wheels were landing on. It turned out to be a training field at Cross City. The first light they had seen was actually a tree that had been decorated for the base Christmas party. Uncle Hawk said that after the relieved airmen got out of the plane, they went to the party and had a real good time.

Recently I heard there's a little town not far from here where they don't use Victorian curlicues. I think I'll drive my little granddaughter over there one of these nights and take her for a walk under the old-fashioned strings of colored bulbs stretched across the street. I bet she'll think it's nice. And maybe, on the way home, I'll tell her the story about Uncle Hawk and the best Christmas-tree lights he ever saw.

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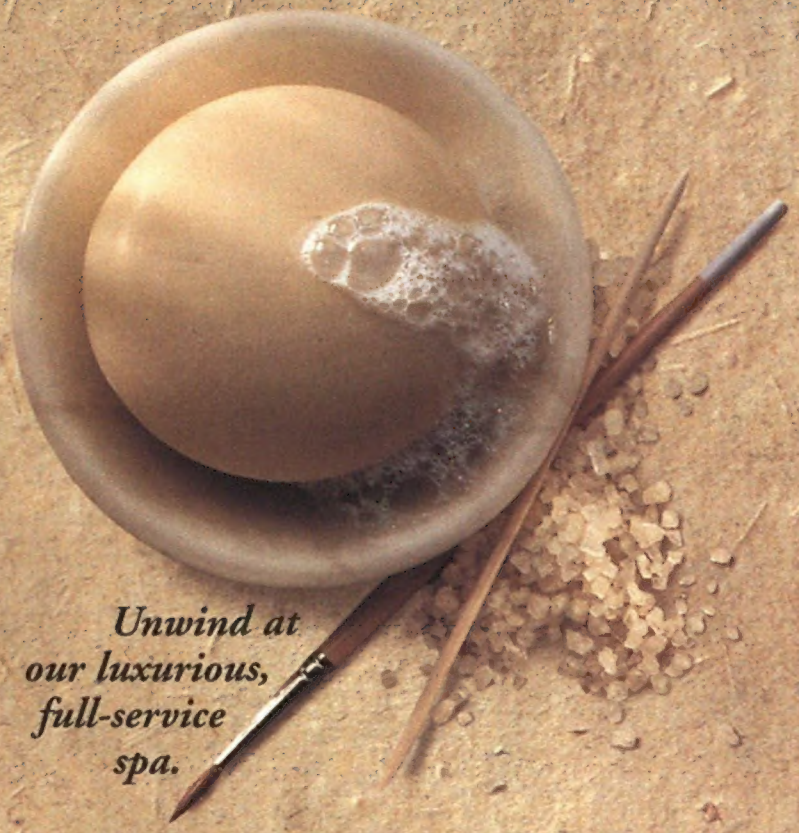

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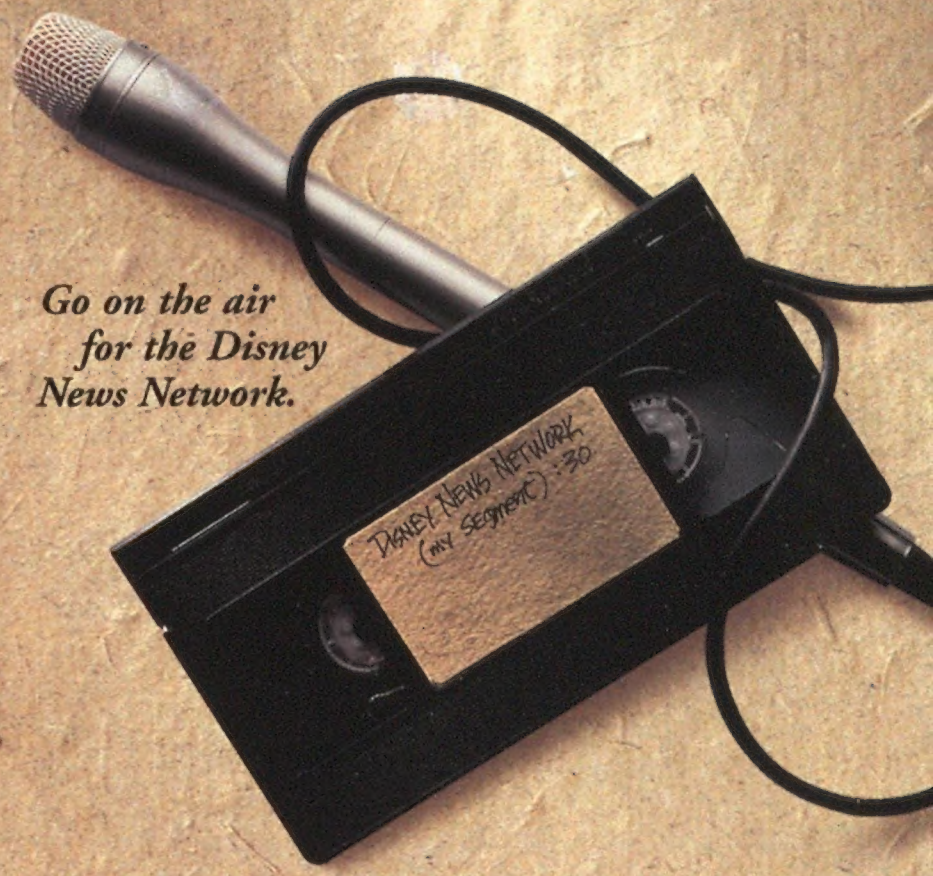

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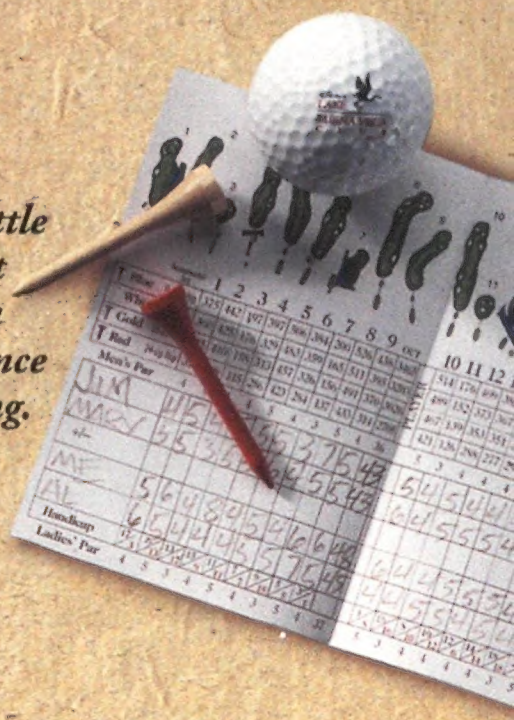

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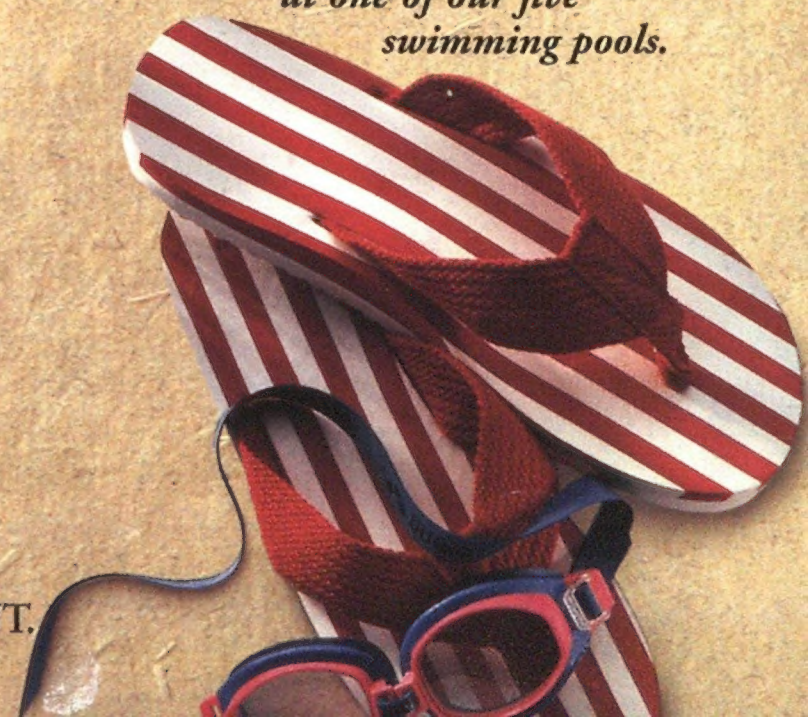

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